THE UNIVERSITY
of EDINBURGH

Assessment of Protective Factors for Violence Risk

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Doctorate in Clinical Psychology

June 2015

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Acknowledgments

I would like to thank my academic supervisors, Dr Nuno Ferreira and Dr Suzanne O'Rourke; I benefited immensely from their experience, expertise and helpful feedback but I am especially grateful for their encouragement and positivity. Thank you also to my clinical supervisor, Dr Liz Flynn, for her guidance, advice, and support; I particularly appreciated her calmness during the trickier early stages of the project and enthusiasm towards the end. I can only hope that a little bit of it has rubbed off on me! A special thank you to Morag Slesser who has been my supervisor and mentor for many years and first introduced me to violence risk assessment; I am thankful for the opportunities and encouragement she has given me.

Thank you to the staff in the Medical Records, Risk Management and Psychology departments in The State Hospital who facilitated access to data for the project and were so welcoming and accommodating, resulting in the initially bumpy road of data collection quickly becoming smoother and more enjoyable.

Thank you to Kate Black, Claire Ogilvie, Gaby Vojt and Kirsty Banks, my very knowledgeable and competent friends, who were willing to share with me their time and expertise as second-raters, proof readers and advisors to the project. Thank you also to my colleague and friend Kirsty Barnes for being interested in my progress and providing carefully selected words of 'encouragement' when needed.

Finally, thank you to Harold; for keeping me company and making me smile through it all.

Contents

List of Tables and Figures

The systematic review and empirical study are written in accordance with the author instructions for the International Journal of Forensic Mental Health (Appendix A).

Word count (excluding references and appendices): 27,428

Thesis Portfolio Abstract

There is increasing interest in protective factors for violence risk and it has been proposed that consideration of protective factors in addition to risk factors may lead to more balanced and accurate violence risk assessments.

Part 1: A systematic review of the literature was conducted to explore the predictive and incremental validity of protective factors assessed using structured professional judgment (SPJ) violence risk assessment tools. Eighteen studies were identified which reported the predictive validity of protective factors for violent behaviour in adolescent and adult males using five different SPJ risk assessment tools. Overall, most studies found that protective factors were associated with the absence of violence. The evidence to support the incremental validity of protective factors (in addition to risk factors) was however less robust and most studies were identified as having a risk of bias which impacted on the potential accuracy and generalisability of the findings.

Part 2: Using a pseudo-prospective design, the predictive and incremental validity of protective factors was explored using the Structured Assessment of Protective Factors (SAPROF) and Historical Clinical Risk Management-20 (HCR-20^{V3}) guidelines in a sample of 75 male patients in a high secure forensic mental health inpatient setting. The SAPROF was associated with the absence of different types of violence within the hospital setting (with AUC values for the total SAPROF score ranging from .69 to .74). The SAPROF did not appear to significantly add to the predictive validity of the dynamic risk factors in the HCR-20^{V3}. The Integrative Final Risk Judgment however demonstrated strong predictive validity (with AUC values

for different types of violence ranging from .74 to .81) and incremental validity in the prediction of violent behaviour.

Part 1: Systematic Review - The predictive validity of protective factors in structured professional judgment violence risk assessments: A systematic review

Abstract

It has been proposed that consideration of protective factors in addition to risk factors may lead to more balanced and accurate violence risk assessments. A systematic review of the literature was conducted to explore the predictive and incremental validity of protective factors assessed using structured professional judgment (SPJ) violence risk assessment tools. Eighteen studies, including five SPJ tools, were identified which reported the predictive validity of protective factors for violence in adolescent and adult males. Overall, most studies found that protective factors were associated with the absence of violence. Evidence to support the incremental validity of protective factors (in addition to risk factors) was however less robust. Inconsistencies in findings across studies may be associated with population characteristics and the relevance of the SPJ tools for different populations. Assessment of risk of bias within the identified studies highlighted limitations which impacted on the potential accuracy and generalisability of the findings of most studies. More robust research is required and professionals should consider the limitations in the existing evidence base if incorporating assessment of protective factors into violence risk assessments.

Introduction

Violence is associated with significant personal, societal and economic costs (Waters, Hyder, Rajkotia, Basu, & Butchart, 2005). The World Health Organization has identified violence as a major public health problem (Krug, Dahlberg, Mercy, Zwi, & Lozano, 2002) and emphasises the need for legislation and implementation of programmes aimed at preventing violence (World Health Organisation, 2014).

The assessment and effective management of violence risk is a core task within forensic mental health, criminal justice and correctional settings. Risk factors that are associated with an increased risk of violence are now well established within the empirical literature (Bonta, Law, & Hanson, 1998; Grendreau, Little, & Goggin, 1996; Hanson & Bussière, 1998; Singh & Fazel, 2010; Witt, van Dorn, & Fazel, 2013) and have been incorporated into risk assessment tools which aid professionals in the assessment of violence risk (for example, the Level of Service/Case Management Inventory; Andrews, Bonta, & Wormith, 2004 and the Historical Clinical Risk Management-20; Douglas, Hart, Webster, & Belfrage, 2013). However, whilst the purpose of violence risk assessment is typically to inform the management and prevention of violence, protective factors that are associated with a decrease in the risk of violence have received less attention than risk factors. It is only recently that the potential benefits of considering protective factors within the violence risk assessment process have been acknowledged (de Vries Robbé, de Vogel, & Stam, 2012). This systematic review aims to investigate the utility of considering protective factors in violence risk assessment.

Protective Factors for Violence

It has been demonstrated that not all individuals who are exposed to risk factors engage in offending behaviour and that engagement in offending behaviour generally declines as the individual ages (Office of the Surgeon General, 2001; Steffensmeier, Allan, Harer, & Streifel, 1989). It can therefore be hypothesised that protective factors may play a role in the absence of offending behaviour or desistance from offending behaviour (including violence). However, a lack of consistency and consensus in the definition, conceptualisation and measurement of protective factors, and related but distinct concepts such as resilience and desistance, make it difficult to integrate the extant literature to identify key protective factors or delineate the mechanisms by which they may operate to reduce violence risk (Farrington, 2007; Fougere & Daffern, 2011; Jones & Brown, 2008; Walker, Bowen, & Brown, 2013).

Whilst definitions of the concept of protective factors vary in the extent to which aspects internal or external to the individual are included, broad definitions typically highlight social, interpersonal, psychological and environmental factors which may reduce the risk of violence (de Vries Robbé, Mann, Maruna, & Thornton, 2015). Most research on protective factors has been conducted in children and adolescents, exploring developmental pathways to offending and resilience when exposed to adverse circumstances. These studies suggest numerous protective factors for violence and other delinquent behaviour in youths, including social relationships and attachments, commitment to school, prosocial attitudes and positive aspects of the neighbourhood environment (Blum, McNeely, &

Nonnemaker, 2001; Fitzpatrick, 1997; Hoge, Andrews, & Leschied, 1996; Jessor, Van Den Bos, Vanderryn, Costa, & Turbin, 1995; Lösel & Farrington, 2012). In adult populations, the existing research on concepts such as desistance or the process of 'knifing off' (changing aspects of the self or moving away from harmful environments and situations) suggests that for adult offenders, relationships, employment, parenthood and the opportunity to develop a new (prosocial) identity or roles may be important factors (Maruna & Roy, 2007; Walker et al., 2013; Weaver, 2014).

There is also a lack of clarity regarding how protective factors are conceptualised; protective factors can be regarded as the absence of risk factors, on a continuum with risk factors, or as independent factors which may or may not have a corresponding risk factor. The mechanisms through which protective factors may operate to reduce the risk of violence also remain unclear. Lösel and Farrington (2012) differentiated direct protective factors from buffering protective factors. Direct protective factors (also referred to as promotive factors) are proposed to have a direct influence in reducing the likelihood of an adverse event such as violence and operate irrespective of the presence of risk factors and level of risk. In contrast, buffering protective factors have an indirect effect on the likelihood of violence, typically through interacting with risk factors to reduce their potency. Buffering protective factors may be particularly relevant in forensic populations where risk factors are likely to be present and some individuals may be at a high risk of engaging in future violence. There has been no clear empirical testing of the

mechanisms by which protective factors operate to influence violence risk and there is a lack of theoretical framework to guide research and practice.

Violence Risk Assessment of Protective Factors

Violence risk assessment typically focuses on the identification of risk factors that are present for the individual, and it has been proposed that including consideration of protective factors within the violence risk assessment process may lead to assessments which are more balanced, comprehensive and accurate (de Ruiter & Nicholls, 2011; Rogers, 2010; Ryba, 2008). As a result, treatment and risk management plans may be more efficient and effective in reducing risk of violence (de Vries Robbé et al., 2012; Wilson, Desmarais, Nicholls, & Brink, 2010). Inclusion of protective factors is also consistent with current strengths-based approaches to rehabilitation in forensic populations (for example, the Good Lives Model, GLM; Ward and Brown, 2004) and may facilitate motivation and reduce scepticism in professionals about the possibility of behaviour change in offenders (de Vogel, de Vries Robbé, de Ruiter, & Bouman, 2011; Roger, 2000; Weaver, 2014). Therefore, despite the limitations in the existing research and difficulties translating findings into practice, there has been an increasing focus on protective factors and their inclusion in violence risk assessment and management planning (de Vries Robbé et al., 2012).

Various tools for assessing violence risk exist which generally adopt one of two approaches that differ in terms of the degree of structure applied to the assessor's decision-making (Douglas, Blanchard, & Hendry, 2013). Actuarial tools require

assessors to score the presence of risk factors which are empirically associated with violence and are predominantly static in nature. Overall judgments of risk are determined by combining the risk factor scores using pre-established algorithms to calculate the probability of future violence. In contrast, structured professional judgment (SPJ) tools guide the assessor to consider the presence of empirically and clinically relevant risk factors but there is no clear guidance regarding how to combine risk factors and the overall judgment of risk (the SPJ risk estimate which is typically rated as high, medium or low) is based on the assessor's own professional judgment.

Whilst some studies suggest that actuarial approaches to violence risk assessment have improved predictive accuracy (Grove, Zald, Lebow, Snitz, & Nelson, 2000; Hilton, Harris, & Rice, 2006), others have identified comparable predictive validity for SPJ tools (Guy, 2008; Singh, Grann, & Fazel, 2011). Actuarial tools typically aim to predict the likelihood of future violence whilst SPJ approaches aim to inform risk management and prevent future violence; the most appropriate approach is likely to be dependent on the decision-making context and purpose of the assessment (Heilbrun, 1997; Skeem & Monahan, 2011).

Hilton et al. (2006) noted that despite the established evidence base for actuarial instruments, clinicians tended to gravitate towards using SPJ approaches. SPJ approaches to violence risk assessment have been recommended in published guidelines (e.g. Risk Management Authority, 2006, 2011) and have been widely integrated into clinical practice (Guy, 2008; Hurducas, Singh, de Ruiter, & Petrila, 2014). SPJ approaches are flexible in that aspects unique to the individual case can

be incorporated into the process and they often include dynamic risk factors which can be targeted in interventions to reduce the risk of violence (Douglas & Skeem, 2005). Inclusion of protective factors within SPJ risk assessment tools may therefore be particularly valuable in informing risk management planning by identifying areas which can be enhanced or developed to reduce the risk of violence (de Vries Robbé et al., 2012).

Aim and objectives

The present systematic review aimed to investigate the utility of protective factors within SPJ risk assessment tools. Whilst SPJ tools aim to inform risk management and the prevention of future violence, it is essential that they are empirically grounded and that the individual factors and overall judgments of risk are associated with violence (Douglas, Hart, et al., 2013). Thus, the objectives of the review were to establish whether protective factors are predictive of the absence of violence; whether including protective factors in addition to risk factors improves the predictive validity of assessments; and whether the overall SPJ risk estimate (which is assumed to include consideration of risk and protective factors) is predictive of violence. Given the limited empirical knowledge about individual protective factors, the review also aimed to highlight which protective factors assessed in SPJ violence risk assessments were associated with the absence of violence.

Method

A review of the Risk Management Authority's (RMA) directory of risk assessment tools (RATED) and recent systematic reviews and meta-analyses pertaining to violence risk assessment identified 11 SPJ violence risk assessment tools which included protective factors (Table 1.1) (Bonta, Blais, & Wilson, 2014; Fazel, Singh, Doll, & Martin, 2012; Hurducas et al., 2014; Risk Management Authority, 2013; Singh, Desmarais, & Van Dorn, 2013; Singh, Grann, & Fazel, 2011; Singh, Serper, Reinharth, & Fazel, 2011; Yang, Wong, & Coid, 2010).

A systematic review of the literature was undertaken to identify studies which reported the predictive validity of protective factors assessed using the 11 SPJ violence risk assessment tools identified. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist (Liberati et al., 2009; Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009) was followed. PRISMA is a 27 item checklist which aims to ensure transparent and complete reporting of systematic reviews and meta-analyses.

Search Strategy

A systematic search of computerised databases (Applied Social Sciences Index and Abstracts (ASSIA), Cumulative Index to Nursing and Allied Health Literature (CINAHL), MEDLINE, PsycINFO and SAGE Journals) was conducted on 26th February 2015 with search terms based on the full and/or abbreviated name of the SPJ tools

Table 1.1 Structured Professional Judgment Violence Risk Assessment Tools including Protective Factors

Structured Professional Judgment tool	Citation
Assessment of Risk and Manageability of Individuals with Developmental and Intellectual Limitations who Offend-Sexually (ARMIDILO-S)	Boer et al., 2013
ASSET [not an abbreviation]	e.g. Baker, Jones, Roberts, and Merrington, 2003
Dynamic Risk Assessment of Offender Re-Entry (DRAOR)	e.g. Serin, Lloyd, and Hanby, 2010
Level of Service/Case Management Inventory (LS/CMI)	Andrews et al., 2004
Structured Assessment of Protective Factors (SAPROF)	de Vogel, de Ruiter, Bouman, and de Vries Robbé, 2012
Structured Assessment of Violence Risk in Youth (SAVRY)	Borum, Bartel, and Forth, 2002
Structured Outcome Risk Measure (SORM)	e.g. Grann et al., 2005
Short-Term Assessment of Risk and Treatability (START)	Webster, Martin, Brink, Nicholls, and Middleton, 2004
Short-Term Assessment of Risk and Treatability: Adolescent Version (START:AV)	e.g. Desmarais, Sellers et al., 2012
Violent Extremist Risk Assessment (version 2) (VERA-2)	Pressman, 2009
Youth Level of Service/Case Management Inventory (YLS/CMI)	e.g. Wormith, Hogg, and Guzzo, 2012

Note: Whilst the LS/CMI and YLS/CMI are both predominantly actuarial tools and focus primarily on risk and needs, assessors are also directed to consider strengths in key areas and are permitted to 'override' the actuarially derived risk classification with a professional judgment risk estimate.

identified (see Appendix B for full search strategy). Where a tool name or abbreviation was also a common word or name, these terms were combined with other relevant terms ("youth justice" or ("risk" N3 "assess*")). Searches were limited by date from 1995 to the date of the search; this start date represented the era when the SPJ approach became more prominent and all the tools searched for in the review were published after the year 2000.

To identify unpublished studies, searches of grey literature databases (ProQuest Dissertations, Open Grey and Health Management Information Consortium) were completed on 4th March 2015 using the same search terms.

Hand searches of the following journals were also conducted: Criminal Justice and Behavior (from February 2000 to March 2015); International Journal of Forensic Mental Health (from 2002 (volume 1) to 2015); and The Journal of Forensic Psychiatry (from 2000 to 2002) followed by The Journal of Forensic Psychiatry and Psychology (from 2003 to 2015). The extensive reference lists within RATED and the references of studies included in the review were also searched.

Study Selection

Inclusion criteria. Studies were included in the review if they reported the predictive validity of protective factors (defined as factors proposed to be associated with a decreased risk of violence) assessed using a SPJ risk assessment tool. Violence was defined as violent or aggressive behaviour towards another person. The review focused on male samples and at least 90 percent of the study sample required to be male for the study to be included as some previous studies

suggest the importance of different protective factors may differ for males and females (Chu et al., 2015; Gammelgård, Weizmann-Henelius, Koivisto, Eronen, & Kaltiala-Heino, 2012). Only studies published in English were eligible for inclusion due to the lack of feasibility to conduct translations.

Only studies which reported the predictive validity of protective factors using the area under the curve (AUC) value were included to facilitate comparisons across studies. Predictive validity in violence risk assessment studies is generally assessed using Receiver Operating Characteristic (ROC) curve analysis and reported as an AUC value (Rice & Harris, 2005; Singh et al., 2013). AUC values represent the probability that a randomly selected individual from the non-violent group will have a higher score on the assessment of protective factors than a randomly selected individual from the violent group; therefore an AUC value of .70 would mean that a randomly selected non-violent individual would have a higher protective factor score 70 percent of the time. AUC values of .50 are regarded as a chance prediction. Relatively few studies (*N* = 6) that met the other eligibility criteria did not report AUC values in relation to violent behaviour and were excluded on this basis.

Exclusion criteria. Studies which included mixed sex populations with less than 90 percent males were excluded unless they reported the predictive validity of protective factors for males separately. Studies which included only general offending or antisocial behaviour as outcome variables were also excluded; these categories typically encompass a wide variety of different behaviours which vary in severity (for example, theft, breach of the peace, assault and sexual offences) and may have different underlying motivations and functions. For studies which

reported the predictive validity of protective factors for both violent and non-violent offending behaviour, the review focused on the results reported for violent behaviour.

Meta-analyses and reviews of previous studies were excluded. Duplicate samples were prevalent throughout the search process; author names, descriptions of the source and recruitment of participants, measures used, and sample sizes were compared to identify potential duplicate samples. Where the degree of overlap was unclear, lead authors of the studies were contacted for clarification. Duplicate and overlapping samples were only retained if they reported additional results pertaining to the relationship between protective factors and violence risk.

Data Extraction

Data were extracted from included studies using a data collection form designed for the purposes of the current review (Appendix C). Information relating to the country in which the study took place; aims and hypotheses; participant characteristics; sampling method; study design characteristics (including the measurement of risk and protective factors and follow-up period) and the study findings were noted. In terms of the study findings, information relating to violence base rates; scores on protective factor scales within the SPJ tools; predictive validity of protective factors; incremental validity of protective factors; predictive validity of SPJ risk estimates; and findings pertaining to individual protective factors were noted.

Assessment of Risk of Bias

An assessment of risk of bias was undertaken for each included study to evaluate the accuracy and generalisability of study findings. Although established checklists exist for assessing the quality of studies, these are generally aimed at studies evaluating the impact of (clinical) interventions. To ensure the criteria were relevant to the studies included in the current review and that key areas of potential bias were assessed, a checklist for assessing risk of bias was developed (see Appendix D for the full guideline and Table 1.2 for a summary). The 10 criteria in the checklist were designed to assess risk of bias across the broad areas identified by the Centre for Reviews and Dissemination (2009) and included consideration of the study design; sampling; measurement of variables; and statistical analyses and interpretation. The criteria were formulated with reference to existing checklists including the Cambridge Quality Checklists which were designed for assessing quality of studies investigating risk factors (Jolliffe, Murray, Farrington, & Vannick, 2012; Murray, Farrington, & Eisner, 2009) and established guidelines for assessing methodological quality of prognostic studies (Hayden, Côté, & Bombardier, 2006; National Institute for Health and Care Excellence, 2012).

A three-point rating scale was used for each criterion: ratings of *well covered* (low risk of bias), *adequately covered* (moderate risk of bias), and *poorly covered* (high risk of bias) were scored 2, 1 and 0 respectively. In addition, a *not covered* option was also available (also scored 0). Higher scores therefore reflected a lower risk of bias. Where there was insufficient information within a study to score a criterion and this information could not be obtained from other studies utilising the

Table 1.2 Summary of Risk of Bias Criteria

Risk of bias criteria		Issues considered
Study Characteristics	Aim(s)/hypotheses	Clarity of description of study aim(s)/hypotheses and appropriateness of study design for investigating these.
	Study design	Establishment of temporal sequence of variables through prospective, pseudo-prospective or retrospective design.
Sample	Description	Clarity and detail in description of study population, including source and relevant key individual characteristics (for example, age, sex, history of violence and psychiatric diagnosis).
	Sampling method	Clarity and detail in description of recruitment process; selection method (for example, cohort/random/opportunistic sampling); appropriateness and representativeness of sample; and application and rationale of any inclusion/exclusion criteria.
	Attrition	Clarity and detail in description of attrition rates and characteristics of participants who 'drop-out'; overall attrition rate; and impact of reasons for attrition or characteristics of those who 'drop-out' on accuracy and generalisability of findings.
	Size (statistical power)	Reporting of post-hoc power calculation; sample size greater than/less than n = 400 (Murray et al., 2009); or sufficient detail reported to enable power analysis to be conducted and sufficient power established.
Measurement and variables	Predictor variable(s) (protective factors)	Level of detail reported on the validity and reliability of measure (SPJ tool); appropriateness of the tool for study population; sources of information used to rate the tool; training/experience of rater; inter-rater reliability; and whether the rater is 'blind' to outcome measure (violence) ratings.
	Outcome variable (violence)	Clarity in definition of variable (violence); consistency between study definition of violence and definition of violence in SPJ tool used to assess predictor variable(s); method of measurement (e.g. official records, observational measures or self-report); inter-rater reliability; and whether the rater is 'blind' to predictor measure (protective factor) ratings.
	Confounding variable(s)	Identification, description and measurement of confounding variable(s) (particularly risk factors).
Analysis	Statistics and interpretation	Clarity in rationale for statistical analysis; appropriateness of analyses; adequate presentation of data and results; and appropriate interpretation of results.

same sample, this criterion was given a score of zero; this was based on the rationale proposed by Murray et al. (2009) who state that "without positive information about study quality, one cannot draw confident conclusions" (p. 7).

Existing quality criteria checklists use various methods to categorise the overall risk of bias in studies. Amalgamating scores may mask important methodological weaknesses; therefore in the current review both the total score and the median rating were calculated to reflect the overall risk of bias within the study. The median rating was used to categorise the overall risk of bias as low, moderate or high risk. Individual areas of bias were also considered when interpreting results.

Assessments of risk of bias were completed by the author. In addition, three studies (16.7% of included studies) representing low, moderate and high risk of bias (based on the author's initial ratings) were randomly selected and rated by a consultant forensic clinical psychologist. Differences in risk of bias ratings were discussed and a consensus rating agreed. Overall the percentage agreement for the criterion ratings was 66.7 percent. There was 70 and 80 percent agreement in ratings for the moderate and low risk of bias studies respectively with discrepant ratings differing by only one point. Agreement for the study which reflected a high risk of bias was 50 percent and discrepant ratings again differed by only one point. The lower level of consistency in ratings for the high risk of bias study appeared to reflect the inherent lack of clarity in the methodology and interpretation of results within the study which made it difficult to rate.

Results

Search Results

The search strategy identified 1,278 records (Figure 1.1). Following removal of duplicate records, 926 records remained. Two of these records were unpublished theses which could not be obtained in full; both authors however had published other studies that were identified within the search results. Of the 924 records that were screened, 600 were excluded following review of the titles and a further 175 were excluded following review of the abstracts. Excluded records at this stage were typically non-English studies; meta-analyses, book reviews or editorials; studies which did not include use of a SPJ risk assessment tool within the study methodology; or studies which had subject matters other than violence risk assessment (for example, assessment of risk in other fields). The remaining 149 records were obtained in full and screened with reference to the review inclusion criteria. This resulted in exclusion of a further 131 records; although the majority of the studies included relevant SPJ tools and many were predictive validity studies, 78.6 percent (*N* = 103) were excluded as they did not report the predictive validity of protective factors. Outcome variables varied across studies and 42.0 percent *(N* = 55) were excluded in relation to this criterion; these studies predominantly, although not exclusively, looked at general categories of offending behaviour rather than violence.

Overall, 6.1 percent (*N* = 8) of the records were excluded as they duplicated or overlapped with the samples reported in other studies that were included. Studies with duplicate and overlapping samples were considered for retention if they

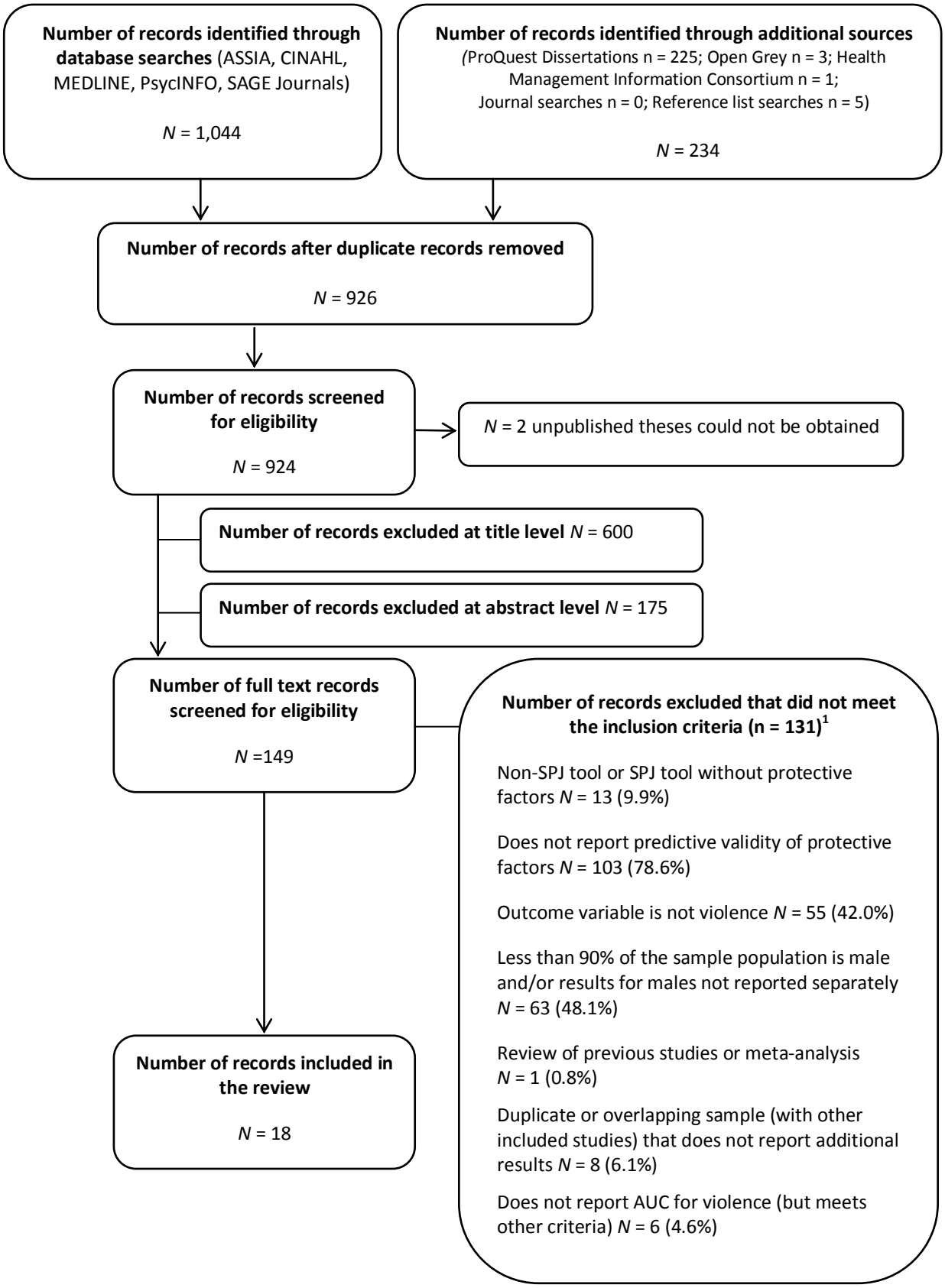

Figure 1.1 Systematic Review Search Process
[1]Studies could be excluded on the basis of more than one criterion.

included results that were more generalisable (in terms of the characteristics of the sample population); reported more detail regarding protective factors; or had the greater sample size. Only one study included in the review reflected a duplicate sample and was retained as it contained additional information (de Vries Robbé, de Vogel, & Douglas, 2013). One study also combined independent samples of three previous studies (Lodewijks, de Ruiter, & Doreleijers, 2010) and was included as it focused specifically on protective factors. Therefore a total of *N* = 18 studies were identified including *k* = 19 independent samples and *n* = 3,896 participants.

Risk of Bias

Study characteristics. Study aim(s) were clearly stated and the design appropriate for investigating the hypotheses in all 18 studies. Seven studies (38.8%) utilised prospective designs which reflected a low risk of bias. The most prevalent methodology was however pseudo-prospective (*N* = 11, 61.1%).

Sample. There was variability across studies in relation to the sampling method. Eight studies (44.4%) clearly described the recruitment or selection process and used total cohort or random sampling techniques. Five (27.8%) studies were rated as poorly covered in relation to the sampling method and therefore had a high risk of bias*;* this was generally due to a lack of clarity regarding the sampling process or use of non-random sampling. Many of the studies identified (*N* = 12, 66.7%) did not report the post hoc statistical power and reported insufficient data for this to be calculated.

Measurement of variables. Most studies (*N* = 15, 83.3%) had either a low or moderate risk of bias in relation to the measurement of protective factors. For those that were rated as a high risk of bias (*N* = 3, 16.6%) this was generally due to not establishing or reporting inter-rater reliability or the validity of the SPJ tool within the population being studied. For the outcome variable (i.e., violence), 12 (66.7%) studies were rated as adequately covered and four (22.2%) were rated as poorly covered; there was therefore a prevalent risk of potential bias across the sample in relation to the measurement of violence. This was typically associated with defining violence as formal convictions or arrests and using only official registers to obtain this information; this definition is generally not consistent with how violence is defined in SPJ tool manuals, is vulnerable to various biases, and is likely to underestimate the prevalence of violence (Krohn, Thornberry, Gibson, & Baldwin, 2010; Loftin & McDowall, 2010). In terms of the assessment of confounding variables, although these were rarely explicitly identified, many of the studies (*N* = 12, 66.7%) did consider risk factors and explored the relationship between protective factors and violence whilst controlling for the influence of risk factors.

Analysis. The majority of studies (*N* = 16, 88.9%) were rated as well or adequately covered in relation to statistical analyses and interpretation. There was however variability in terms of reporting of base rates of violence within study samples and relatively few studies made corrections for multiple comparisons or statistical analyses.

Overall risk of bias. Potential areas of bias were identified within all of the studies (Table 1.3) and only one study (5.6%) was rated as a low risk of bias overall. The majority of studies (*N* = 15, 83.3%) were rated as having a moderate risk of bias overall and two studies (11.1%) were considered to contain a high risk of bias.

Study Characteristics

In terms of SPJ tools, seven studies (38.9%) used the SAVRY (Dolan & Rennie, 2008; Lodewijks et al., 2010; McEachran, 2001; Richard, 2011; Schmidt, Campbell, & Houlding, 2011; Shepherd, Luebbers, Ogloff, Fullam, & Dolan, 2014; Vilojen et al., 2008); four (22.2%) used the SAPROF (de Vries Robbé, de Vogel, & de Spa, 2011; de Vries Robbé, de Vogel, Koster, & Bogaerts, 2015; de Vries Robbé et al., 2013; Zeng, Chu, & Lee, 2015); three (16.7%) used the START (Braithwaite, Charrette, Crocker, & Reyes, 2010; Desmarais, Nicholls, Wilson, & Brink, 2012; Inett, Wright, Roberts, & Sheeran, 2014); one (5.6%) used the LS/CMI (Wormith, Hogg, & Guzzo, 2012); one (5.6%) used the DRAOR (Yesberg & Polaschek, 2015); one (5.6%) used the START and the SAPROF (Abiden et al., 2013); and one (5.6%) used the SAVRY and the SAPROF (Klein, Rettenberger, Yoon, Köhler, & Briken, 2015). Characteristics

Table 1.3 Risk of Bias Ratings

	Risk of Bias Criteria										Risk of Bias Ratings		
	Study characteristics		Sample				Measurement and variables			Analysis			
Citation	Aim(s)	Design	Description	Sampling method	Attrition	Size/ Power	Predictor variable(s) (protective factors)	Outcome variable (violence)	Confounding variable(s)	Statistics and interpretation	Total score (max 20)	Median rating	Overall risk of bias
Abiden et al. (2013)	WC	WC	AC	WC	PC	AC	AC	PC	AC	AC	11	AC	Moderate
Braithwaite et al. (2010)	WC	WC	AC	AC	WC	NC	PC	AC	AC	WC	12	AC	Moderate
de Vries Robbé et al. (2011)	WC	AC	WC	WC	WC	NC	WC	AC	NC	AC	13	AC-WC	Moderate
de Vries Robbé et al. (2013)	WC	AC	WC	WC	WC	NC	WC	AC	AC	AC	14	AC-WC	Moderate
de Vries Robbé et al. (2015)[1]	WC	AC	WC	AC	WC	NC	WC	AC	AC	AC	13	AC	Moderate
Desmarais, Nicholls, et al. (2012)	WC	AC	WC	WC	PC	AC	WC	WC	AC	WC	15	WC	Low
Dolan & Rennie (2008)	WC	WC	WC	PC	WC	NC	AC	AC	AC	WC	13	AC-WC	Moderate
Inett et al. (2014)	WC	WC	AC	AC	NC	PC	PC	PC	PC	PC	6	PC	High
Klein et al. (2015)	WC	AC	WC	AC	AC	NC	WC	PC	AC	WC	12	AC	Moderate
Lodewijks et al. (2010)	WC	AC	WC	AC	AC	NC	WC	AC	AC	AC	12	AC	Moderate
McEachran (2001)	WC	AC	AC	WC	AC	AC	WC	AC	PC	AC	12	AC	Moderate
Richard (2011)	WC	AC	WC	PC	AC	AC	AC	AC	AC	WC	12	AC	Moderate
Schmidt et al. (2011)	WC	AC	AC	WC	PC	NC	PC	AC	PC	AC	8	AC	Moderate
Shepherd et al. (2014)	WC	WC	WC	PC	PC	NC	WC	AC	NC	PC	9	PC-AC	High
Vilojen et al. (2008)	WC	AC	WC	WC	AC	NC	WC	WC	PC	AC	13	AC-WC	Moderate
Wormith et al. (2012)	WC	WC	AC	PC	WC	WC	AC	AC	AC	AC	13	AC	Moderate
Yesberg & Polaschek (2015)	WC	AC	WC	WC	WC	NC	AC	AC	AC	AC	13	AC	Moderate
Zeng et al. (2015)	WC	AC	WC	PC	WC	NC	AC	PC	AC	WC	11	AC	Moderate

Note: WC = well covered; AC = adequately covered; PC = poorly covered; NC = not covered

[1]de Vries Robbé, de Vogel, Koster, and Bogaerts (2015)

Table 1.4 Summary of Structured Professional Judgment Violence Risk Assessment Tools Used in Studies Included in the Review

Tool (citation)	Description	Items	Domains	Rating/scoring criteria
SAVRY (Borum et al., 2002)	Designed to assess risk of violence in adolescents aged 12 to 18 years.	24 (6 pertaining to protective factors)	(1) Historical; (2) Social/Contextual; (3) Individual/Clinical; (4) Protective factors	Protective factors are rated as either present or absent (and assigned a core of 1 or 0 respectively in research). Maximum possible score is therefore six. Assessors are instructed to make a summary risk rating (based on professional judgment) of Low, Moderate or High.
SAPROF (de Vogel et al., 2012)	Designed to assess protective factors for violence (including sexual violence) risk and to be used in combination with other tools which assess risk factors. Developed within an adult forensic psychiatric setting.	17	(1) Internal; (2) Motivational; (3) External	All items rated on a three point scale (0 to 2) to reflect the degree to which the factor is present. Higher scores indicate greater presence of protective factors. Maximum possible score is 34. Assessors are instructed to make two professional judgments of Low, Moderate or High: a final Protection Judgment (degree to which protective factors reduce risk) and an Integrative Final Risk Judgment (integrating the SAPROF and assessment of risk factors).
START (Webster et al., 2004)	Designed to assess short-term (one to eight weeks) risk of harmful behaviour (violence, self-harm, suicide, substance abuse, victimisation, self-neglect and unauthorised absences) in forensic mental health settings.	20	All items are dynamic and are rated in terms of the extent to which they represent a risk (or vulnerability) and a strength.	All items rated on a three point scale (0 to 2) to reflect the degree to which the factor is present. Higher scores on the Strengths scale indicate greater presence of strengths. Maximum possible Strengths score is 40. Assessors are directed to make specific risk estimates of Low, Moderate or High.
DRAOR (e.g. Serin, Lloyd, and Hanby, 2010)	Designed to assess and monitor risk of recidivism and inform case management of offenders living in the community.	19 (6 pertaining to protective factors)	(1) Stable (criminal orientation and impulsivity); (2) Acute (self-control and lifestyle stressors); (3) Protective (prosocial and identity changes)	All items rated on a three point scale (0 to 2) to reflect the degree to which the factor is present. Total possible score for protective factors is 12 with higher scores indicating greater presence of protective factors.
LS/CMI (Andrews et al., 2004)	Designed to inform case management and treatment planning in offenders aged 16 and over.	43 (across 8 domains which can also be rated as a strength)	(1) Criminal History; (2) Education/Employment; (3) Family/Marital; (4) Leisure/Recreation; (5) Companions; (6) Procriminal Attitude/Orientation; (7) Substance Abuse; (8) Antisocial Pattern	Each of the eight domains can be identified as a strength for the individual. Therefore the maximum number of strengths is eight. Final risk/need summary ratings are calculated based on the scores of the 43 general risk/need items, however assessors are permitted to "override" this classification and are instructed to consider any strengths when making this judgment.

Note: SAVRY = Structured Assessment of Violence Risk in Youth; SAPROF = Structured Assessment of Protective Factors; START = Short-Term Assessment of Risk and Treatability; DRAOR = Dynamic Risk Assessment of Offender Re-entry; LS/CMI = Level of Service/Case Management Inventory

of these tools are described in Table 1.4. No studies utilising the ASSET, ARMIDILO-S, SORM, START:AV, VERA-2 or YLS/CMI met the review inclusion criteria.

Table 1.5 presents a summary of the studies included in the review. Sixteen (88.9%) of the studies were published in peer-review journals and two (11.1%) were unpublished theses. The studies derived from a wide range of countries including Australia, Canada, England, Germany, Ireland, New Zealand, The Netherlands, Singapore and the United States.

In terms of the 19 independent samples, 11 (57.9%) focused on adolescents and eight (42.1%) on adult populations. Sample sizes ranged from 28 to 1,905. Some studies focused on specific populations such as sexual offenders or offenders with a diagnosis of mental disorder or learning disability. The majority of individuals included in the various samples had a previous history of violence. The base rate of violence within the samples during the follow-up periods varied across studies and ranged from 2 percent to 71 percent of the sample engaging in violent behaviour. However, there was considerable variability in how violence was defined and measured and the follow-up periods used which impacts on the interpretation of these figures. Follow-up periods ranged from 30 days to over 15 years, with around half of the studies reporting follow-up periods of approximately 1 year. Twelve studies (66.7%) explored violence committed in the community, five (27.8%) reported on violence in secure, residential or inpatient settings, and one (5.6%) reported on both violence in the community and residential settings. Data on protective factors for five (26.3%) of the samples were collected as part of routine professional or clinical practice; eleven (57.9%) were noted to have been collected

Table 1.5 Summary of Studies Included in the Review

Author, year, country	Size of sample	Sample characteristics	Main aim(s)	Study design	Protective factors – SPJ tool(s), method, mean scores	Violence – type, method, number of incidents	Key findings (relationship between protective factors and violence)
Abiden et al. (2013) Ireland	100 (94% male)	Resident in forensic mental health hospital providing high, medium and low security. Length of stay in hospital: *M* = 7.3 years (*SD* = 9.9) Age: *M* = 40.5 years (*SD* = 12.8) Most common psychiatric diagnosis: Schizophrenia (69%).	Explore psychometric properties and predictive validity of the SAPROF and START compared to other instruments of risk, psychopathology and global functioning.	Prospective Follow-up period: approx. six months	SAPROF START Rated by researcher as part of routine clinical management. Ratings based on patient interview, case notes and staff consultation. For violent group: SAPROF *M* = 13.1 (*SD* = 6.3); START-S *M* = 14.6 (*SD* = 9.1). For non-violent group: SAPROF *M* = 21.8 (*SD* = 6.1); START-S *M* = 25.2 (*SD* = 10.4).	Adverse events with violence defined as in the START manual (actual, attempted or threatened harm to others). Incidents collated by researcher from routine incident report forms, nursing logs and statutory forms for seclusion and restraint. Base rate of violence: 7.1 per 10,000 patient days at risk [with the study having a total of 18,190 days at risk, therefore approx. 13 incidents of violence]. *n* = 13 patients were violent to others.	Protective factors and strengths were associated with an absence of violence. Total SAPROF score predicted absence of violence (AUC .85, *p* = .001) and total START-S score predicted absence of violence (AUC .78, *p* = .001). Most individual items also significantly predicted absence of violence (AUC values ranged from .49 to .79 for all SAPROF items and .62 to .80 for all START-S items). SAPROF and START-S correlated negatively with dynamic risk factors (assessed by the HCR-20). Significant interaction between HCR-20 (dynamic factors) and SAPROF; suggesting the SAPROF had a "true" protective effect. Difference in SAPROF and START-S scores between violent and non-violent group was no longer significant when HCR-20 dynamic scores were taken into account.
Braithwaite et al. (2010) Canada	34 133 START assessments	Resident in a risk management and rehabilitation unit in a civil psychiatric hospital. Length of stay in hospital: *M* = 64.5 days (*SD* = 60.6)	Assess predictive validity of START clinician ratings and SPJ risk estimates; and to develop 'optimised' strengths and	Prospective Follow-up period: 30 days	START Rated by clinicians (no method reported). START-S *M* = 14.8 (*SD* = 6.4)	Aggression to others (combining physical, verbal and sexual aggression and stalking behaviours). Rated by research assistants who coded	Lower START-S scores were associated with increased aggression towards others (AUC .65, *p* < .05). START-S scores did not predict aggression to others when past aggressive behaviour was controlled for. SPJ risk estimates (clinician judgment based on vulnerabilities and strengths ratings) were not

Author, year, country	Size of sample	Sample characteristics	Main aim(s)	Study design	Protective factors – SPJ tool(s), method, mean scores	Violence – type, method, number of incidents	Key findings (relationship between protective factors and violence)
		Age: *M* = 40.0 years (*SD* = 13.4) Most common psychiatric diagnosis: Schizophrenia (74%).	vulnerabilities scales.			START-outcome measure using file information. 71 incidents of aggression. *n* = 24 patients were aggressive towards others.	predictive of aggression towards others (AUC .52).
de Vries Robbé et al. (2011) The Netherlands	126 (*n* = 105 included in predictive validity analyses)	Violent offenders released from forensic psychiatric hospital. Length of treatment: *M* = 5.3 years (*SD* = 2.2) Age: *M* = 31 years (*SD* = 7.3) The majority (83%) had diagnosis of personality disorder and 65% also had a history of substance misuse. All had a history of violent offending. For 56% the index offence was (attempted) homicide.	Explore predictive validity of the SAPROF; and changes in SAPROF scores (between admission and discharge).	Pseudo – prospective Follow-up periods: 1, 2 and 3 years post-discharge.	SAPROF Rated by researchers from file information. Total SAPROF score: *M* = 11.7 (*SD* = 6.4)	Violent recidivism defined as any new conviction according to the HCR-20 definition of violence (actual, attempted or threatened violence). Based on data from an official register. Reconvictions for violence: 1 year *n* = 8; 2 years *n* = 15; 3 years *n* = 20.	Across all follow-up periods, the SAPROF total score and Final Protective Judgment significantly predicted desistance from violence (AUCs ranged from.71 to.85, $p < .01$). Across all follow-up periods, the HCR-20 total score minus the SAPROF total score and the Integrative Final Risk Judgment significantly predicted violent recidivism (AUCs ranged from .65, $p < .05$ to .85, $p < .01$). The HCR-20 total score minus the SAPROF total score was a significantly better predictor than the HCR-20 total score alone (at 1 and 3 year follow-up). Individual SAPROF factors which were the best predictors were Self-Control (AUCs ranged from .73 to .83) and Work (AUCs ranged from .71 to .83).

Author, year, country	Size of sample	Sample characteristics	Main aim(s)	Study design	Protective factors – SPJ tool(s), method, mean scores	Violence – type, method, number of incidents	Key findings (relationship between protective factors and violence)
de Vries Robbé, de Vogel, Koster, and Bogaerts (2015) The Netherlands	83	Sexual offenders discharged from forensic psychiatric hospitals. Length of treatment: *M* = 5.4 years (*SD* = 2.5) Age: *Median* = 30 years (*SD* = 7.5) 45% had diagnosis of personality disorder; 14% had diagnosis of a sexual disorder. Around 25% had sexually offended against children. Almost half of the total sample had previous convictions for non-sexual violent offence(s).	Validate the SAPROF for assessing risk of general and sexual violence in sexual offenders (alongside the HCR-20 and SVR-20).	Pseudo-prospective Follow-up period: 1 year (for general violence only), 3 years and long-term (*M* = 15.1 years (*SD* = 5.3)).	SAPROF Rated by researchers from file information. Total SAPROF score: *M* = 12.3 (*SD* = 5.9)	Violent recidivism defined as any new conviction for sexual violence or general violence (with the latter including sexual violence). Based on data from an official register. Reconvictions for sexual violence: 1 year *n* = 2%; 3 years *n* = 7%; long-term *n* = 19%. Reconvictions for general violence: 1 year *n* = 7%; 3 years *n* = 17%; long-term *n* = 45%.	Sexual violence: The SAPROF total score was a significant predictor of desistance from sexual violence across 3 year and long-term follow-up periods (AUCs .76, $p < .05$ and AUC .71, $p < .01$ respectively). The final risk judgments predicted desistance from sexual violence for the long-term follow-up period (AUC for Final Sexual Risk Judgment .71, $p < .05$) but not the 3 year follow-up period. The SAPROF total score had incremental validity over risk factors (HCR-20 and SVR-20) for sexual violence at both 3 year and long-term follow-up periods. General violence: The SAPROF total score was a significant predictor of desistance from general violence across all follow-up periods (AUCs ranged from .74, $p \leq .001$ to .83, $p < .05$). The Final Protection Judgment also significantly predicted desistance from violence (AUCs ranged from .66 to .79, $p < .05$). The HCR-20 minus SAPROF score and Final Risk Judgment significantly predicted general violent recidivism across all follow-up periods (AUCs ranged from .67 to .89, $p < .01$). The SAPROF total score had incremental validity over risk factors (HCR-20 and SVR-20) for general violence at long-term follow-up (but not 1 or 3 year follow-up).
de Vries Robbé et al. (2013) The Netherlands	188 *overlapping sample with de Vries Robbé et al.,*	Violent and sexually violent offenders released from forensic psychiatric hospital. Length of treatment: *M* =	Explore whether protective factors are similar for violent and sexually violent offenders and	Pseudo – prospective Follow-up period: 1 year, 3 year	SAPROF Rated by researchers from file information.	Violent recidivism defined as any new conviction according to the HCR-20 definition of violence (actual, attempted or threatened violence).	*Results additional to de Vries Robbé, 2010; 2015*[1] At long-term follow-up, the SAPROF total score significantly predicted desistance from violence (AUC .73, $p \leq .001$) as did the HCR-20 minus SAPROF total score (AUC .70, $p \leq .001$).

Author, year, country	Size of sample	Sample characteristics	Main aim(s)	Study design	Protective factors – SPJ tool(s), method, mean scores	Violence – type, method, number of incidents	Key findings (relationship between protective factors and violence)
	(2010; 2015[1])	5.5 years (*SD* = 2.3) Age: *M* = 32 years (*SD* = 7.3) 66% had diagnosis of personality disorder; 15% had diagnosis of a psychotic disorder; 72% had a history of substance misuse.	whether there are interaction effects between risk and protective factors.	and long-term (*M* = 11.1 years) post-discharge.		Based on data from an official register. Reconvictions for violence for violent offenders (*n* = 105): 1 year *n* = 8%; 3 years *n* = 19%; long-term *n* = 30%. Reconvictions for violence for sexually violent offenders (*n* = 83): 1 year *n* = 7%; 3 years *n* = 17%; long-term *n* = 45%.	Offence history (violence or sexual violence) did not moderate the relationship between protective factors and recidivism (therefore, protective factors may operate in the same way for both types of offender). The HCR-20 minus SAPROF total score was a significantly better predictor than the HCR-20 total score alone (but only at long-term follow-up). The SAPROF had incremental validity (when added to the HCR-20 dynamic factors) at 3 year and long-term follow-up). An interaction term (SAPROFxHCR-20) was significant at 3 year follow-up. The positive effect of protective factors was most evident for high and moderate risk groups (and less so for the low risk group).
Desmarais, Nicholls, et al. (2012) Canada	120	Resident in secure forensic psychiatric hospital. Length of stay in hospital: approx. *M* = 6 years (*SD* = 6). Age: *M* = 50.0 years (*SD* = 11.7) Most common psychiatric diagnosis: Schizophrenia spectrum disorders (85%)	Explore reliability and predictive and incremental validity of the START.	Pseudo-prospective Follow-up period: 1 year	START Rated by researchers from file information. START-S *M* = 18.5 (*SD* = 8.1)	Aggression (including verbal aggression, physical aggression-objects, and physical aggression-others). Data obtained from a previous study; incidents collated from file information and coded using the OAS. 196 incidents of aggression. *n* = 65	Lower START-S scores were associated with increased aggressive behaviour (AUC .76, $p < .05$). Strength scores were significantly higher in those patients who did not engage in aggressive behaviour compared to those who did. The SPJ risk estimate (based on vulnerabilities and strengths ratings) was predictive of aggressive behaviour (AUC .80, $p < .05$). START-S scores added to the predictive ability of the historical (static) items in the HCR-20 for physical aggression towards others (but not for other types of

Author, year, country	Size of sample	Sample characteristics	Main aim(s)	Study design	Protective factors – SPJ tool(s), method, mean scores	Violence – type, method, number of incidents	Key findings (relationship between protective factors and violence)
		80% had a violent index offence. 75% also had prior charges.				patients were aggressive.	aggressive behaviour). SPJ risk estimates added to the predictive validity of the HCR-20 historical items, START-S and START-V for all types of aggressive behaviour.
Dolan & Rennie (2008) England	99	Adolescents (who met criteria for diagnosis of Conduct Disorder) released from custody. Length of sentence: *M* = 17.9 months (*SD* = 11.9) Age: *M* = 16.2 years (*SD* = 0.8) 64.7% charged with a violent offence.	Explore predictive and incremental validity of the SAVRY and PCL:YV.	Prospective Follow-up period: 12 months	SAVRY Rated from interview and file information. SAVRY protective scale *M* = 1.7 (*SD* = 1.7)	Violent recidivism (robberies, assaults, murder, sexual assaults and kidnapping). Based on official database including prosecutions, cautions, reprimands, final warnings and convictions. 38.4% committed a violent offence. Number of incidents per participant: *M* = 1.0 (*SD* = 2.0).	The total score on the SAVRY protective scale did not predict violence (AUC .57) and it did not add incremental validity to the total score on the SAVRY risk factors. The SPJ risk rating was a significant predictor (AUC .64, $p < .05$) of violence; however it did not add incremental validity to the total score on the SAVRY risk factors.
Inett et al. (2014) England	28 157 START assessments	Resident in a low secure hospital in a Forensic Intellectual Disability Service. Length of stay in hospital: *M* = 2 years, 4 months Age: *M* = 39 years	Evaluate predictive validity of the START in males with Intellectual Disability.	Prospective Follow-up period: 30 and 90 days	START Rated by multidisciplinary team (no method reported). START-S *M* = 20.9 (*SD* = 7.5)	Overt aggression (including verbal aggression, physical aggression, sexually inappropriate [behaviour], property damage/theft and fire setting). Adverse Incident form	Strengths were associated with increased levels of overt aggression. Total START-S significantly predicted overt aggression at 90 day follow-up (AUC .72, $p < .001$). However, START-S scores were associated with decreased levels of aggression within the subcategories of overt aggression for the 30 and 90 day follow-up periods suggesting a typographical error for the overall START-S AUC values. For example, AUCs for the 90 day

Author, year, country	Size of sample	Sample characteristics	Main aim(s)	Study design	Protective factors – SPJ tool(s), method, mean scores	Violence – type, method, number of incidents	Key findings (relationship between protective factors and violence)
		78.6% diagnosed with Learning Disability.				developed for the study completed by ward staff. 1,797 incidents of overt aggression recorded.	follow-up period: verbal aggression .43, *ns*; physical aggression .29, $p < .001$; sexually inappropriate [behaviour] .43, *ns*; property damage/theft .33, $p < .001$; fire setting .40, *ns.*
Klein et al. (2015) Germany	71	Juveniles who had been charged with sexual offences and referred to a Family Intervention Team for assessment. Age: *M* = 14.6 years (*SD* = 1.4) Most common index offences were sexual coercion (rape or sexual assault) (43.7%) and sexual child abuse (32.4%).	Explore predictive accuracy of protective factors for recidivism and incremental validity of protective factors beyond risk factors.	Pseudo – prospective Follow-up period: *M* = 47.8 months (*SD* = 9.6)	SAPROF SAVRY Rated by psychologists from file information. SAPROF *M* = 12.9 (*SD* = 4.5) and SAVRY protective scale *M* = 2.8 (*SD* = 1.5).	Recidivism defined as charges or convictions (including violent and sexual recidivism). Based on official police database. *n* = 36 charged with a violent offence; *n* = 10 charged with a sexual offence.	The SAPROF total score significantly predicted the absence of violent recidivism (AUC .65, $p = .03$). The Final Protection Judgment also predicted the absence of violent recidivism (AUC .64, $p = .04$). Intelligence and Self-control items predicted absence of violent recidivism (AUC .64, $p = .05$ and .70, $p < .001$ respectively). The Internal domain was also predictive of an absence of violent recidivism (AUC .68, $p = .01$). None of the AUCs however remained statistically significant when multiple comparisons were accounted for. SAPROF scores did not significantly predict the absence of sexual recidivism. The total score on the SAVRY protective scale and the individual SAVRY protective items did not significantly predict the absence of violent or sexual recidivism. The SAPROF and SAVRY protective factors did not add incremental validity to the SAVRY risk factors for violent or sexual recidivism.
Lodewijks et al. (2010) The	3 samples: (1) *n* = 111 (2) *n* = 66 (3) *n* = 47	Adolescents with a history of violence who were at different stages of the judicial process ((1) pre-	Explore impact of protective factors on reoffending in known violent	Pseudo – prospective Follow-up:	SAVRY Rated by psychologists based on file information.	Violence defined based on SAVRY manual definition.	The total score on the SAVRY protective scale significantly predicted desistance from violent recidivism across all three samples; (1) AUC .28, $p < .01$; (2) AUC .13, $p < .001$; (3) AUC .16 $p < .001$.

Author, year, country	Size of sample	Sample characteristics	Main aim(s)	Study design	Protective factors – SPJ tool(s), method, mean scores	Violence – type, method, number of incidents	Key findings (relationship between protective factors and violence)
Netherlands		trial; (2) during residential treatment; and (3) following release from residential treatment). (1) Age: *M* = 15.3 years (*SD* = 1.3); index offence: 53% robbery. (2) Age: *M* = 14.4 years (*SD* = 1.6); index offence: 50% robbery. (3) Age: *M* = 17.5 years (*SD* = 0.9); index offence: 66% aggravated assault.	offenders.	ranged from *M* = 13 (*SD* = 13) to 22 (*SD* = 10.6) months depending on sample.		(1) Official convictions based on official register. (2) Physical violence based on institutional incident files. (3) Crimes reported to police based on official police information.	The SAVRY protective scale significantly added to the predictive validity of dynamic risk factors within the SAVRY for samples (2) and (3). Medium-to-high risk individuals were significantly more likely to engage in violent behaviour when protective factors were absent across all three samples. Low-to-medium risk individuals were significantly more likely to engage in violent behaviour when protective factors were absent for samples (2) and (3) only. Across all samples, Strong Social Support and Strong Attachment and Bonds were the most significant predictors of desistance from violent recidivism.
McEachran (2001) Canada	108	Convicted adolescents referred for court-ordered inpatient psychological and psychiatric assessment. Age: *M* = 15.3 years (*SD* = 1.1) 33.3% had a conviction for violence; 60.2% had non-violent convictions.	Explore predictive validity of the SAVRY and PCL:YV.	Pseudo – prospective Outcome assessed when individuals were between 18 and 21 years.	SAVRY Rated by researcher based on file information. SAVRY protective scale *M* = 0.7 (*SD* = 1.2)	Recidivism defined as provincial convictions. Violent recidivism included murder, manslaughter, attempted murder, robbery, kidnapping, possession of a weapon and arson. Based on data from an official database.	The total score on the SAVRY protective scale was associated with absence of violence (AUC .61). The SAVRY SPJ risk rating was associated with violent recidivism (AUC .89).

Author, year, country	Size of sample	Sample characteristics	Main aim(s)	Study design	Protective factors – SPJ tool(s), method, mean scores	Violence – type, method, number of incidents	Key findings (relationship between protective factors and violence)
Richard (2011) Canada	235	Adolescents who had been released from youth detention facilities. Time in custody: *M* = 193.2 days (*SD* = 204.4) Age: *M* = 17.1 years (*SD* = 1.1) 38.7% had a violent index offence and 87.6% admitted to having committed a prior violent offence.	Explore the predictive validity of the SAVRY and PCL:YV; explore the difference between youth who continue to offend and those who desist; and explore whether protective factors are associated with desistance.	Pseudo – prospective Follow-up periods: 1, 5 and 10 years	SAVRY Rated by researcher based on file and interview notes. SAVRY protective scale *M* = 1.3 (*SD* = 1.3)	Recidivism defined as convictions. Violent recidivism included murder, manslaughter, attempted murder, robbery, kidnapping, possession of a weapon and arson. Based on official police records. 62% committed at least one violent offence during the follow-up period.	The total score on the SAVRY protective scale significantly predicted desistance from violence at the 10 year follow-up period (AUC .63, *p* <. 01), but not at the shorter follow-up periods. The SAVRY protective scale added to the validity of the total score on the SAVRY risk scale with an increase in the amount of variance explained and percentages of youths correctly classified. Strong Social Support, Positive Attitude towards Interventions and Authority and Strong Commitment to School were significantly associated with absence of violence. However, Pro-social Involvement was significantly associated with violent recidivism.
Schmidt et al. (2011) Canada	80 (Total study sample: *n* = 130; SAVRY sample: *n* = 128, 62.5% male reported separately).	Adolescents referred to a court clinic for mental health assessment to assist in disposition decision making. Age (SAVRY sample): *M* = 14.9 years (*SD* = 1.4)	Examine long-term predictive and incremental validity of SAVRY, YLS/CMI and PCL:YV.	Mixed (pseudo – prospective for SAVRY sample) Follow-up period: *M* = 10.4 years (*SD* = 1.3)	SAVRY Rated by psychologist and psychology graduate student based on mental health records. SAVRY protective scale *M* = 1.4 (*SD* = 1.5)	Violent recidivism defined as murder, attempted murder, assault (and/or with weapons), utter[ing] threats and arson. Based on official police records. Approx. 30% of the total study sample committed a violent offence.	The total score on the SAVRY protective scale was associated with absence of violent recidivism (AUC .67) as was the SPJ risk estimate (AUC .71). The total score on the SAVRY protective scale, the SPJ risk estimate and a SAVRY total (risk) x SAVRY protective total interaction term did not add to the predictive validity of the SAVRY risk factor total score.

Author, year, country	Size of sample	Sample characteristics	Main aim(s)	Study design	Protective factors – SPJ tool(s), method, mean scores	Violence – type, method, number of incidents	Key findings (relationship between protective factors and violence)
Shepherd et al. (2014) Australia	175 (*n* = 139 included in predictive validity analyses) (Total study sample: *n* = 213; *n* = 175 male reported separately).	Adolescents detained in Youth Justice Centres. Age (total sample): *M* = 16.8 years (*SD* = 1.8) 87% previously charged with a violent offence.	Examine application of SAVRY, YLS/CMI and PCL:YV in Australian youth, including predictive validity (for violent and general recidivism) and differences across gender.	Prospective Follow-up period: 6 – 18 months	SAVRY Rated by researchers from interview and database information. SAVRY protective scale *M* = 1.8 (*SD* = 1.9)	Violent recidivism defined as a violent transgression that led to a police charge. Based on official police records. 59% committed a violent offence during the follow-up period.	The total score on the SAVRY protective scale significantly predicted the absence of violent recidivism (AUC .71, $p < .001$). The SPJ risk rating also significantly predicted the absence of violent recidivism (AUC .64, $p < .01$).
Vilojen et al. (2008) United States	169	Adolescents admitted to residential sexual offending treatment programme. Age: *M* = 15.4 years (*SD* = 1.5) All had engaged in sexually abusive behaviour and 50.9% had previous charges for sexual offences.	Explore predictive validity of SAVRY, J-SOAP-II and J-SORRAT-II.	Pseudo – prospective During treatment follow-up period: *M* = 389.7 days (*SD* = 232.3) Following release from treatment follow-up period: *M* = 6.6 years (*SD* = 3.5)	SAVRY Rated by researchers based on file information.	Sexual and non-sexual aggression. Based on official and file information for both during treatment and following release outcome periods. During treatment: 16.6% were sexually aggressive and 30.2% were non-sexually aggressive. Following release: 8.3% committed a sexual offence and 12.7% committed a non-sexual violent offence.	During treatment, the total score on the SAVRY protective scale was significantly associated with non-sexual aggression (AUC .62, $p < .05$) (but not sexual aggression). The total score on the SAVRY protective scale was not significantly associated with sexual or non-sexual aggression following release from treatment. The SAVRY SPJ risk estimate was not significantly associated with aggression during treatment or following release.

Author, year, country	Size of sample	Sample characteristics	Main aim(s)	Study design	Protective factors – SPJ tool(s), method, mean scores	Violence – type, method, number of incidents	Key findings (relationship between protective factors and violence)
Wormith et al. (2012) Canada	1,905 (97.1% male)	Sex offenders who had received community based disposals or were released from custodial sentences. Length of custodial sentence: *M* = 224.2 days (*SD* = 152.5) Age: *M* = 41.9 years (SD = 12.7)	Examine the predictive validity of LS/CMI for sex offenders and explore the use of the professional over-ride.	Prospective Follow-up period: *M* = 1,658.7 days (*SD* = 106.7)	LS/CMI Completed by professionals in routine practice. LS/CMI strengths score *M* = 0.71 (*SD* = 1.5)	Violent recidivism defined as offences which result in return to correctional services. Based on official database of criminal offences. *M* = 12.3% (*SD* = 0.3) committed a violent offence during the follow-up period.	The total LS/CMI strengths score significantly predicted violent non-recidivism (AUC .56, $p < .01$). The risk levels determined by the professional over-ride were not significant. Where the professional over-ride reduced the overall risk level, strengths were not correlated with this reduction.
Yesberg & Polaschek (2015) New Zealand	299	High risk offenders released from prison and subject to input from Probation services. Age: *M* = 31.9 years (*SD* = 8.5) Number of previous convictions for violence: *M* = 4.5 (*SD* = 4.1). The most serious index offence was a violent offence for 61% of the sample.	Investigate structure and properties (including validity) of the DRAOR.	Prospective Follow-up period: 6 months	DRAOR Completed by supervising probation officers based on interviews with multiple informants. DRAOR protective scale *M* = 5.5 (*SD* = 2.2)	Recidivism defined as any new conviction (including convictions for violence). Based on official conviction records. Base rate of violence noted as 6.4%.	The total score on the DRAOR protective scale did not significantly predict violence (AUC .61). The DRAOR total score (which is comprised of the total score on the risk factors minus total score on protective factors) also did not significantly predict violence (AUC .60).
Zeng et al. (2015) Singapore	97	Adolescent sexual offenders referred for assessment of risk and suitability for treatment.	Explore utility of measure of protective factors in youth who	Pseudo-prospective	SAPROF Rated by psychologists from file information.	Sexual recidivism defined as the occurrence of an offence that resulted in a criminal charge.	Neither the SAPROF total score nor domain scores were predictive of sexual desistance (AUC values ranged from .45 to .52 and were all statistically non-significant).

Author, year, country	Size of sample	Sample characteristics	Main aim(s)	Study design	Protective factors – SPJ tool(s), method, mean scores	Violence – type, method, number of incidents	Key findings (relationship between protective factors and violence)
		Age: *M* = 15.1 years (*SD* = 1.4) years Most common previous sexual offence was molestation (76.3%).	sexually offended, including prediction of desistance.	Follow-up period: approx. *M* = 4.5 years (*SD* = 491 days)	SAPROF *M* = 12.5 (*SD* = 3.9)	Based on official police records. 7.2% (*n* = 7) sexually reoffended.	The SAPROF total score did not add to the predictive validity of the ERASOR risk factors in the prediction of sexual recidivism (however the ERASOR was not a significant predictor on its own).

Note: SPJ = structured professional judgment; *M* = mean; *SD* = standard deviation; SAPROF = Structured Assessment of Protective Factors; START = Short-Term Assessment of Risk and Treatability [START-S is START strengths items and START-V is START vulnerabilities (or risk) items]; AUC = area under the curve; HCR-20 = Historical Clinical Risk Management-20; SVR-20 = Sexual Violence Risk Protocol; OAS = Overt Aggression Scale; SAVRY = Structured Assessment of Violence Risk for Youth; PCL:YV = Psychopathy Checklist: Youth Version; YLS/CMI = Youth Level of Service/Case Management Inventory; J-SOAP-II = Juvenile Sex Offender Assessment Protocol–II; J-SORRAT-II = Juvenile Sexual Offense Recidivism Risk Assessment Tool-II; LS/CMI = Level of Service Case Management Inventory; DRAOR = Dynamic Risk Assessment for Offender Re-entry; ERASOR = Estimate of Risk of Adolescent Sexual Offence Recidivism.

by researchers or were based on pseudo-prospective designs; and for the remaining two (11.1%) it was not possible to determine, based on the reported information, whether data had been collected for the purposes of violence risk assessment and management or the research study. Due to the heterogeneity in studies a narrative rather than meta-analytic synthesis was undertaken.

Synthesis of Findings

Predictive validity of protective factors. Of the 19 independent samples, protective factors significantly predicted the absence of violence in 52.6 percent (k = 10) with AUCs ranging from .56 to .87. The lower range score (AUC .56) was found in the LS/CMI study (Wormith et al., 2012) which had the largest sample size (n = 1,905) and this may account for why the study was able to detect such a small effect. Two of the studies (McEachran, 2001; Schmidt et al., 2011) reported the AUC but not the significance level; these were .67 and .61 respectively and would be regarded as medium and small effect sizes (Rice & Harris, 2005). The studies which found that protective factors predicted the absence of violence assessed protective factors using the START, SAPROF, SAVRY and LS/CMI and covered inpatient and community violence as well as adolescent and adult populations. Violence was assessed using various methods including official (for example police databases) and non-official (such as case files or staff observations) sources and utilised prospective and pseudo-prospective designs. Studies which were assessed as having a low, moderate and high risk of bias all reported protective factors as significant predictors of an absence of violence.

Results for the remaining seven samples (36.8%) varied with three of these reporting mixed results. Klein et al. (2015) found in their sample of adolescents charged with sexual offences that the SAPROF total score significantly predicted the absence of violence (AUC .65) but not sexual violence. These authors also used the SAVRY and noted that the protective scale did not predict absence of either violent or sexual recidivism. Richard (2011) reported that in a sample of adolescents released from detention facilities, the protective factor scale on the SAVRY only predicted desistance from violence at 10 year follow-up periods (AUC .63) and not at the shorter follow-up periods. Both of these studies were noted to have a moderate risk of bias and in particular had potential biases in relation to sampling and the assessment of violence. A study by Inett et al. (2014) also reported mixed results when using the START within an inpatient forensic learning disability service. These authors highlighted that higher scores on the strengths scale were associated with the presence (rather than absence) of overt aggression (AUC .72). Although the authors explore the possible reasons for this finding, it is inconsistent with the other results in the study where higher START strengths scores were associated with the absence of all types of aggression within the overt aggression category (ranging from .57 to .71). This study was rated as having a high risk of bias and had a number of methodological limitations associated with the measurement of variables and interpretation of the results; from scrutiny of the data presented it appears possible that the finding that higher START strengths scores are associated with overt aggression may have been a typographical error.

For three samples (15.8% of all samples), protective factors did not significantly predict an absence of violence. Zeng et al. (2015) used the SAPROF to explore protective factors in a sample of adolescent sexual offenders and found that it was not predictive of desistance from sexual violence (AUC .48). The only study in the review to use the DRAOR (Yesberg & Polaschek, 2015) reported an AUC for protective factors of .61 which did not reach statistical significance. This study assessed protective factors in high risk offenders released from prison for only six months and based violence outcome on official conviction data. Both of these studies had been evaluated as having a moderate risk of bias. Dolan and Rennie (2008) found that the protective scale of the SAVRY did not predict desistance from violence (AUC .57) in a sample of adolescents who met the criteria for a diagnosis of Conduct Disorder and had been released from custody. This study was rated as having a moderate risk of bias; it utilised a prospective design rating the SAVRY from both interview and file information however aspects of the population sampling method were unclear therefore impacting on the generalisability of the findings.

The final study assessed protective factors using the SAVRY in a sample of adolescent sexual offenders admitted to a residential treatment programme and explored the predictive validity for sexual and non-sexual aggression both during treatment and following release (Vilojen et al., 2008). Based on the results reported, protective factors were predictive of the presence of non-sexual aggression during treatment (AUC .62), which would be contrary to the hypothesis that protective factors reduce the risk of violence. The SAVRY protective scale did not predict sexual aggression during treatment or any type of violence following

release. This study was rated as having a moderate risk of bias and included a relatively unique population and study setting. Further, unfortunately the prevalence of protective factors within the sample was not reported.

Incremental validity of protective factors. Nine studies (50.0% and *k* = 10 independent samples) explored the incremental validity of protective factors (relative to risk factors). There was considerable heterogeneity within these studies in terms of definitions of violence, length of follow-up periods and the risk factors assessed which impact on the conclusions that can be drawn. Broadly, for six samples (60.0%), including protective factors in the assessment added to the predictive validity of dynamic and static risk factors; however in some studies this was dependent on the type of violence or the length of follow-up period. There was no clear pattern evident in terms of SPJ tool or method of rating, sample population or setting, or measurement of violence to account for the differences.

Only four studies (22.2%) looked at interaction effects between risk and protective factors; the results were variable and authors highlighted that multicollinearity impacted on the reliability of the findings. De Vries Robbé et al. (2013) and Lodewijks et al. (2010) looked at protective factors within different SPJ risk estimate classifications; both report evidence to support that the positive effect of protective factors was most evident in higher than lower risk groups which would suggest protective factors reduce risk of violence indirectly through their impact on risk factors.

Predictive validity of SPJ estimates of risk. The predictive validity of the professional judgment of risk was reported for nine of the samples (47.4%); five

(55.6%) found that the professional risk judgments consistently predicted violence with AUCs ranging from .64 to .89. In one study (11.1%), the SPJ estimate of risk was only a significant predictor for general and sexual violence at longer follow-up periods (de Vries Robbé, de Vogel, Koster, & Bogaerts, 2015). One study (11.1%) noted that the SPJ risk estimate had an AUC value of .71 but did not report the statistical significance (Schmidt et al., 2011) and two studies (22.2%) found that the SPJ risk estimate did not significantly predict violence (Braithwaite et al., 2010; Wormith et al., 2012). Braithwaite et al. (2010) looked at the predictive validity of START assessments in a psychiatric inpatient setting; although the total START scores for the risk and strengths scales significantly predicted violence (AUCs .66 and .65 respectively), the AUC for the professional judgment of risk (AUC .52) was not significant. Assessments in this study were conducted as part of clinical practice where judgments of risk may have influenced interventions and therefore subsequent outcomes. Wormith et al. (2012) found that when assessors used the override within the LS/CMI to change the overall risk classification, this change in risk rating for their sample of sexual offenders was not associated with their strength scores which would challenge the assumption that strengths scores are considered when making SPJ risk estimates.

Three studies (16.7%) looked at the incremental validity of professional judgments over total scores with only one study (Desmarais, Nicholls, et al., 2012) reporting that the professional judgment had incremental validity in terms of predicting violence. This study was rated as having a low risk of bias.

Predictive validity of individual protective factors. Six of the eighteen studies (33.3%) reported on the predictive validity of individual factors within the SPJ tools. It should be noted that only one controlled for multiple comparisons and given the relatively small sample sizes and large number of protective factors in the tools, these results should be regarded as preliminary. Abiden et al. (2013) reported that the strongest predictors of absence of violence (assessed using the START) were Impulse Control, External Triggers and Rule Adherence (with AUCs ranging from .75 to .80). Braithwaite et al. (2010) constructed an optimised START strength scale of items that were most significantly associated with challenging behaviour in an in-patient setting; this scale included Recreational, Mental State, Impulse Control, External Triggers, Rule Adherence and Conduct and was therefore similar to the items identified by Abiden et al. (2013).

Three studies reported findings from individual items of the SAPROF. Abiden et al. (2013) reported that most of the SAPROF items were predictive of absence of violence (with AUCs ranging from .67 to .79); the items with the highest AUCs were Leisure Activities, Financial Management and Self-Control. De Vries Robbé et al. (2011) identified that Self-Control and Work were the best predictors in their sample and Klein et al. (2015) reported that Intelligence (AUC .64) and Self-Control (AUC .70) predicted absence of violence in their sample of adolescents.

Two studies covering four independent samples reported on the predictive validity of individual protective factors in the SAVRY. Strong Social Support was identified as a significant predictor of absence of violence across all samples (Lodewijks et al., 2010 and Richard, 2011). Strong Attachments and Bonds was

significant in three of the samples and Positive Attitude towards Intervention and Authority and Strong Commitment to School was significant in two samples. Resilient Personality Traits was not a significant predictor for any sample, and Prosocial Involvement was associated with increased violence in one study (Richard, 2011).

Discussion

Predictive Validity of Protective Factors

Eighteen studies reporting on the predictive validity of protective factors in SPJ violence risk assessments were reviewed. In most studies, protective factors consistently and significantly predicted the absence of violence (with AUC values ranging from .56 to .87). There was also a tendency for SPJ risk estimates to be predictive of violence (with AUC values ranging from .64 to .89). Incremental validity of protective factors (over risk factors) varied and in some studies the significance of the results was dependent on the follow-up period and type of violence.

Although there was a tendency for protective factors to be associated with an absence of violence, the majority of the studies were assessed as having a moderate risk of bias which impacts on the potential accuracy and generalisability of the findings. Further, in relation to the AUC values for protective factors, although statistically significant, some AUC values were relatively low and may not necessarily be regarded as being of sufficient magnitude to inform professional decision-making. For example, the AUC value of .56 reported by Wormith et al.

(2014) corresponds to only a 56 percent probability that a randomly selected non-violent individual would have a higher score on the measure of protective factors (compared to a violent individual).

Only two studies reported findings contrary to the hypothesised link between protective factors and violence and suggested that the presence of protective factors was significantly associated with violent behaviour (Inett et al., 2014; Vilojen et al., 2008). One of these studies was assessed as having a high risk of bias and is noted to have limitations in terms of the assessment of protective factors, measurement of violence and the interpretation of the results. Whilst the other study had a moderate risk of bias, it was noted that it was a relatively unique population and setting (adolescent sexual offenders in a residential treatment setting) which may further impact on the generalisability of the findings. The base rate of violence was also not reported for this study and where the base rate is low AUC values can be accentuated (Singh, Desmarais, & van Dorn, 2013).

Within the review there were a number of studies which reported either mixed results or found that protective factors were not predictive of violent behaviour. Population characteristics may be particularly relevant in understanding the findings of some of these studies. For example, the three studies which focused on adolescent sexual offenders (Klein et al., 2015; Vilojen et al., 2008; Zeng et al., 2015) reported either mixed or negative results. These studies focused on a complex population and none of the SPJ tools used were specifically designed for the assessment of adolescent sexual offenders. In terms of adolescents, it is possible that protective factors may differ depending on age or developmental stage and

different protective factors may be relevant for young people compared to adults (Stouthamer-Loeber, Wei, Loeber, & Masten, 2004). It is noteworthy that two of the three studies used the SAPROF and that recently a youth version of this tool has been published (de Vries Robbé, Geers, Stapel, Hilterman, & de Vogel, 2015).

In addition to age, the timing of the assessment may also be relevant in other ways. For example, Ullrich and Coid (2011) conducted a study of protective factors in offenders released from prison and found that the impact of the factors on violent recidivism varied depending on the length of time since release from custody with accommodation being important immediately following release and employment factors only becoming relevant after three years. In terms of the studies included in the review, the majority conducted risk assessments either immediately before or after leaving prison or hospital and therefore arguably reflect a particular stage in the rehabilitation process. Although some studies did utilise long follow-up periods (sometimes of several years), many of the protective factors included in the tools within the review are dynamic in nature and may therefore have changed during the follow-up period.

In relation to sexual offending, desistance may be associated with unique protective factors not currently captured in existing SPJ tools. De Vries Robbé, Mann, et al. (2015) highlighted that many risk factors for sexual violence are specific to this type of violence (such as sexual preoccupation, deviant sexual interest or emotional congruence with children); protective factors which would correspond to these risk factors are not currently captured in the existing SPJ tools. Individuals who have committed sexual offences may also be subject to increased levels of

supervision and monitoring as part of their risk management (e.g. Scottish Government, 2014) and this could impact on the predictive accuracy of the assessment. In the existing research on violence risk assessment which focuses on the predictive validity of risk factors, it has been argued that there is a "risk paradox" (Lewis & Doyle, 2009) whereby when the aim is to successfully manage risk it would be anticipated that predictions should not be accurate. Similar arguments can also be made in relation to the predictive validity of protective factors for violence where there are treatments or interventions which aim to increase protective factors. This may be particularly relevant in the study by Vilojen et al. (2008) which was conducted in a residential treatment setting where treatment focused on offending behaviour. Interventions and treatment informed by The Good Lives Model is also a prominent treatment approach in forensic populations, particularly for sexual offenders (Ward, Polaschek, & Beech, 2006); treatment can incorporate the development of skills to achieve primary goods (for example, inner peace, excellence in work and community) which may map onto some of the protective factors identified within SPJ risk assessment tools (such as self-control, work and leisure, and social and relationship networks) and therefore impact on the findings of predictive validity studies. In addition to the three studies in the review which focused on adolescent sexual offenders, two studies focused on adult sexual offenders (de Vries Robbé, de Vogel, Koster, & Bogaerts, 2015; Wormith et al., 2014); although these studies both reported significant findings in the expected direction, one reported a low AUC value and the other was published

by an author of the SPJ tool and may therefore be susceptible to authorship bias (Singh, Grann, & Fazel, 2013).

A number of individual protective factors were highlighted as predictors of an absence of violence; although these should be regarded as preliminary findings due to relatively small sample sizes compared to the number of variables assessed, common factors were identified across studies and related to the potentially positive impact of work, leisure and recreational activities as well as impulse and self-control. What is perhaps noteworthy is that despite all tools featuring factors related to social relationships and networks and the relevance of these being highlighted in the desistance literature (e.g. Kazemian, 2007; McNeill & Weaver, 2010), none of the studies featuring adult populations identified these protective factors as potent predictors. It is possible that relational protective factors may operate by interacting with or accentuating other protective factors; for example the positive influence of pro-social colleagues at work or work being important to gain funds to provide for one's family. Research also conceptualises desistance as a process (Bushway, Thornberry, & Krohn, 2003) and the majority of existing SPJ risk assessment tools may capture successful completion of this process rather than the actual process of desistance itself. This highlights difficulties in integrating and translating findings on protective factors from criminological research into violence risk assessment practice.

Implications for Practice

The results of this review suggest that inclusion of protective factors within SPJ approaches to violence risk assessment is promising. However, the available evidence is not consistent and the lack of clarity within the general literature on protective factors for violence risk makes it difficult to confidently and effectively incorporate consideration of protective factors into violence risk assessment practice. Practitioners should be mindful that the evidence base for protective factors for violence risk assessment remains at an early stage compared to the extant research literature on risk factors, and temper risk conclusions accordingly.

SPJ violence risk assessment requires expertise and can be time consuming compared to other approaches (Green, Carroll, & Brett, 2010); establishing the utility of including an additional assessment of protective factors for violence may therefore be necessary before they are integrated into routine professional practice. Most SPJ risk assessment tools allow assessors to highlight additional case-specific risk factors; there may therefore also be an opportunity to highlight relevant protective factors at this stage. It also remains unclear whether protective factors are truly distinct from risk factors and it is possible that some existing SPJ tools focusing on risk factors could incorporate consideration of pertinent protective factors through adaptations of definitions and guidelines.

This review focused primarily on the predictive validity of protective factors and whilst it is important to establish this association, it has been suggested that protective factors may have other benefits within the risk assessment process. A recent study which has explored clients' experiences of the risk assessment process

suggests the process is viewed negatively (Vojt, Marshall, Thomson, & Williams, 2014). Incorporating protective factors and a more positive approach may help to facilitate engagement and a collaborative approach is likely to enhance client adherence to risk management and rehabilitation strategies. It has also been suggested that protective factors can be targeted and enhanced through interventions thereby reducing risk; one study utilising the SAPROF focused on the change in scores over time and reported positive results with changes in protective factors being associated with a reduction in recidivism (de Vries, Robbé, de Vogel, Douglas, & Nijman, 2015). The impact protective factors have on the desistance process may be particularly relevant as Jessor et al. (1995) suggest that whilst risk is more strongly associated to the outcome behaviour (violence), protective factors may be more relevant in the process of change (desistance from violence). Therefore, in addition to the predictive validity, there may be other important practical benefits to including protective factors in the violence risk assessment process which relate more directly to risk management, treatment planning and facilitating engagement.

Implications for Research

During the search process for the present review, many studies were identified which did not report the predictive validity of protective factors despite assessing these; given the increasing interest in protective factors researchers should be encouraged to report the predictive validity of protective factors and assess their relationship with risk factors when this data is available. Studies which explore the

relationship between protective factors and absence of violence (including the predictive validity); the incremental validity of protective factors when added to risk factors; interactions between risk and protective factors; and the relationship between protective factors and violence at different levels of risk are likely to be particularly helpful as they reflect the process in professional practice in terms of identifying relevant factors, integrating them into a formulation, and identifying risk management strategies and targeting interventions appropriately. Some of the studies in the present review considered these aspects well (for example, de Vries Robbé et al., 2013; Lodewijks et al., 2010), however these were studies that predominantly focused on exploring protective factors whilst others tended to primarily report the results relating to risk factors. It may be that with increasing interest in protective factors, the reporting of risk and protective factors will become more balanced.

In addition to reporting on the overall performance of SPJ tools, a focus on individual protective factors would also help to advance the evidence base. It is important that within SPJ tools individual protective factors are associated with the outcome variable (i.e., violence). This poses problems for research where the sample size may be limited and there are often several items within the tools. Researchers may therefore wish to explore and report preliminary findings.

Consistency across research studies in relation to the design, measurement and reporting of results may make amalgamating research findings more feasible and support more robust conclusions. Singh, Yang, Mulvey, and The RAGEE Group (2015) recently developed the Risk Assessment Guidelines for the Evaluation of

Efficacy (RAGEE) Statement, a 50-item checklist of reporting standards for predictive validity studies in violence risk assessment. The items in the checklist would also be applicable to studies which investigate the predictive validity of protective factors. Standards within the RAGEE statement which were covered well in the studies included in this review include "report the number of items on the instrument under investigation" and "identify the temporal design of the study". Those which were less well covered included "report whether risk assessment(s) were conducted in the context of research or practice"; this is particularly problematic in the prospective studies where it is possible that the assessments informed practice and risk management and therefore the likelihood of a violent outcome. Whilst assessments which inform practice may reduce the predictive accuracy if violence is effectively prevented, these studies also have ecological validity as they reflect how the assessment tools are used in practice. Therefore, research would benefit from clarity and clear specification of whether the risk assessments conducted impacted on the management and treatment of the individual being assessed. The RAGEE statement also includes a standard relating to attrition ("report the rate of attrition"). This was also a criterion in the risk of bias assessment in this review as attrition can impact on the generalisability of the results. Although most studies were rated as adequately covered in relation to this criterion, this was generally due to the use of a pseudo-prospective design and therefore a pre-selected sample for which available data was available. Some studies which did report attrition also explored the characteristics of those for whom data was not available (e.g. Schmidt et al., 2011); this is particularly helpful in

facilitating interpretation of the results and assessing the generalisability of the final sample. Reference to the RAGEE standards and consideration of why these are important to report would help to develop a robust evidence base on protective factors from which conclusions regarding the utility of considering protective factors in violence risk assessment could be drawn.

In addition to establishing the predictive validity of the protective factors, it would also be beneficial for research studies to explore the other areas in which protective factors may be beneficial, for example in facilitating engagement of those being assessed or in informing treatment and risk management planning. In particular, research study designs which can demonstrate whether changes in protective factors are associated with changes in risk level and rates of offending behaviour would be particularly beneficial.

Most of the SPJ risk assessment tools which include protective factors are relatively new and many studies are published by the authors of the tools and on the same types of population. As these studies may be susceptible to authorship bias and because it is important to establish the validity of the tools in other populations, researchers and professionals should be encouraged to explore the utility of new tools and disseminate their findings.

Strengths and Limitations

There is increasing interest in protective factors amongst professionals and an apparent desire to incorporate these into violence risk assessment. However, although promising, the empirical evidence base is in its infancy and there are

important limitations which practitioners should be aware of when making judgments about an individual's risk. The present review helps to highlight these limitations. Further, the review focused on SPJ tools which are available and currently used in practice, therefore further enhancing the practical utility of the findings. A significant finding in the review was that although many studies assessed protective factors they did not report the predictive validity of these within published studies; this suggests that there may be considerable existing data which would help to further advance our understanding of protective factors.

Although clinically relevant, the review included a number of different SPJ risk tools which conceptualised or defined protective factors in different ways. The review also included studies from different populations (for example adolescents and adults) and methodologies differed. The heterogeneity within the studies is therefore apparent and a meta-analytic synthesis was not possible. Further, although a narrative synthesis was conducted, it was not possible to draw clear conclusions about population sub-groups, specific SPJ tools, or different types of violence which may be particularly helpful for professional practice. The review also focused on the AUC value as a measure of predictive validity; although this is a common measure reported in violence prediction studies (Singh, Desmarais, & Van Dorn, 2013), it is not without its limitations (Lobo, Jiménez-Valverde, & Real, 2008; Szmukler, Everitt, & Leese, 2012) and this, combined with the risk of bias identified across all studies, impacts on the conclusions which can be drawn from the included studies. Finally, this review focused on only one aspect of protective factors, that of

predictive validity, and as previously stated, including protective factors in violence risk assessment practice may have a number of other potential benefits.

Conclusions

The assessment of violence risk is an important and core task for professionals in clinical, criminal justice and correctional settings. In recent years, there has been increasing interest in assessing and enhancing protective factors to reduce the risk of future violence. The present systematic review found a general trend for protective factors within existing SPJ violence risk assessment tools to be associated with an absence of violence, however results were not consistent and it was unclear whether including protective factors enhanced the predictive validity of assessments that only included risk factors. The need for more empirical evidence from methodologically robust studies was identified. The limited evidence base for protective factors in comparison to risk factors was noted and the need for professionals to consider this when making decisions regarding risk is emphasised.

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Empirical Study: Aims and Hypotheses

The systematic review identified that the evidence base relating to protective factors for violence risk was limited and that whilst protective factors assessed using structured professional judgment (SPJ) violence risk assessment tools were generally associated with the absence of violence, further research was required to establish the predictive and incremental validity of these tools.

The present empirical study aimed to examine the predictive and incremental validity of one tool, the Structured Assessment of Protective Factors (SAPROF), within a forensic mental health inpatient setting. It was hypothesised that the SAPROF would predict the absence of violent behaviour within the hospital and that the SAPROF and overall SPJ level of risk would have incremental validity over the assessment of risk factors alone.

Risk factors were assessed using the new version of the Historical Clinical and Risk Management – 20 (HCR-20^{V3}) therefore, a secondary aim of the study was to explore the predictive validity of the HCR-20^{V3} and to consider the utility of the SAPROF when combined with the HCR-20^{V3}.

Part 2: Empirical Study - Assessment of protective factors for violence risk: the predictive validity of the Structured Assessment of Protective Factors (SAPROF) in a forensic inpatient setting

Abstract

It has been proposed that consideration of protective factors in addition to risk factors may improve the accuracy of violence risk assessments, however existing research remains limited. Using a pseudo-prospective design, the predictive and incremental validity of protective factors was explored using the Structured Assessment of Protective Factors (SAPROF) and Historical Clinical Risk Management-20 (HCR-20^{V3}) guidelines in a sample of 75 male patients in a high secure forensic mental health inpatient setting. The SAPROF was associated with the absence of different types of violence within the hospital setting whilst dynamic risk factors within the HCR-20^{V3} were associated with the presence of violence. The SAPROF did not significantly add to the predictive validity of the dynamic risk factors, however the Integrative Final Risk Judgment demonstrated strong predictive validity (with AUC values ranging from .74 to .81) and incremental validity in the prediction of violent behaviour.

Introduction

The assessment and management of violence risk is a core task within forensic mental health settings where there is a need for comprehensive risk assessment and defensible risk management decisions to prevent future violent behaviour (Scottish Government, 2007; Risk Management Authority, 2007). Violence has significant personal and economic consequences (Krug, Dahlberg, Mercy, Zwi, & Lozano, 2002; Waters, Hyder, Rajkotia, Basu, & Butchart, 2005) and violence within inpatient settings, such as secure forensic hospitals, can also have organisational consequences such as reduced quality of service provision and work performance when programmes and regimes are disrupted due to violence or when violence has a negative impact on staff turnover, morale, motivation, and absenteeism rates (Gadon, Johnstone, & Cooke, 2006).

Violence risk assessment in forensic mental health typically utilises the structured professional judgment (SPJ) approach; this approach is recommended for use in forensic mental health settings by the Risk Management Authority (RMA; 2006, 2011) and has been integrated into government legislation and guidelines relating to the care and management of forensic patients (Scottish Government, 2010). The SPJ approach aims to guide clinical practice and prevent violence through informing risk management planning (Douglas, Blanchard, & Hendry, 2013). The process involves identifying what factors, that have been empirically validated and shown to be associated with violence, are present and relevant for the individual being assessed. These factors are then integrated into a risk formulation and risk scenarios are developed (Douglas, Hart, Webster, & Belfrage, 2013). Unlike

actuarial approaches to violence risk assessment where the individual's level of risk is determined through numerical algorithms, in the SPJ approach the assessment of risk factors is combined into an overall level of risk (referred to as the summary risk judgment, estimate or rating) using the assessor's professional judgment (Douglas, Ogloff, & Hart, 2003).

Various SPJ risk assessment tools have been developed to guide the assessment of violence risk; these tools highlight the factors that assessors should consider in the risk assessment process. SPJ risk assessment tools often include dynamic factors which are amenable to change and can therefore be targeted to reduce the risk of violence (Douglas & Skeem, 2005). Despite the overall aim being the prevention of future violence, the majority of existing SPJ risk assessment tools focus predominantly on risk factors which are associated with an increased risk of violence as opposed to protective factors which are proposed to be associated with a decreased risk of violence. Wilson, Desmarais, Nicholls, and Brink (2010) commented that "the amount of attention devoted to considering the role of protective factors has been nothing short of trivial." (p. 283).

It has been suggested that consideration of protective factors within violence risk assessment could lead to more accurate, balanced and comprehensive assessments (Rogers, 2000; Ryba, 2008). Identification of protective factors may also highlight important intervention or treatment targets if enhancing protective factors reduced or facilitated the management of risk. This may be particularly helpful in instances where risk factors are present which are static or less amenable to change (de Ruiter & Nicholls, 2011). A focus on protective factors is also consistent with current

rehabilitative and strengths-based approaches (such as the Good Lives Model (Ward & Law, 2010)) in forensic settings. Incorporating positive aspects into the risk assessment process may also facilitate engagement in forensic clients (Ullrich & Coid, 2011) and enhance professionals' motivation and optimism (de Vogel, de Vries Robbé, de Ruiter, & Bouman, 2011). Although these propositions have face validity, there is relatively little empirical support in the extant literature which remains predominantly focused towards risk factors.

Research on protective factors and related concepts such as resilience and desistance highlights a lack of clarity and consensus regarding how the concepts are defined and conceptualised (Farrington, 2007; Jones & Brown, 2008; Lösel & Farrington, 2012). For example, protective factors have been defined as the absence of risk factors, on a continuum with risk factors (i.e. they have a corresponding risk factor) or as being independent factors in their own right with no corresponding risk factor (de Vogel et al*.,* 2011). There is also no clear theoretical model to explain the mechanisms by which protective factors might operate to reduce risk of violence, particularly in relation to how they interact with existing risk factors. Protective factors may operate in different ways; they may have a direct effect on behaviour or reduce risk of violence through reducing the potency of risk factors (Rogers, 2000). The lack of theoretical underpinning may account for the limitations in the research and makes successfully incorporating consideration of protective factors into violence risk assessment practice challenging.

In recent years there has been increasing interest in the assessment of protective factors for violence risk. The Structured Assessment of Protective Factors (SAPROF;

de Vogel, de Ruiter, Bouman, & de Vries Robbé, 2012) was developed to assess protective factors for violence risk and to be used in combination with existing risk assessment tools which focus on the assessment of risk factors. The SAPROF contains protective factors which were empirically or clinically identified as being associated with reductions in recidivism and are predominantly dynamic in nature (for example Self-control, Work, Leisure and Social Network).

The emerging evidence base for the SAPROF focuses primarily on its predictive validity. Coding the SAPROF retrospectively from file information, de Vries Robbé and colleagues demonstrated that the SAPROF total score and overall judgments of risk significantly predicted an absence of convictions for violence and sexual violence in patients discharged from a forensic psychiatric hospital with follow-up periods ranging from 1 to 11 years (de Vries Robbé, de Vogel, & de Spa, 2011; de Vries Robbé, de Vogel, & Douglas, 2013; de Vries Robbé, de Vogel, Koster, & Bogaerts, 2015). Results of analysis focusing on whether the SAPROF had incremental validity over SPJ tools focusing on risk factors varied and significant outcomes depended on the length of the follow-up period and the type of violence being predicted (de Vries Robbé et al., 2013; de Vries Robbé, de Vogel, Koster, & Bogaerts, 2015).

Two studies utilising the SAPROF have explored protective factors for inpatient aggression and found that an increased presence of protective factors was associated with an absence of violence in forensic inpatient settings where patients had predominantly diagnoses of personality disorder or schizophrenia (Abiden et al., 2013; de Vries Robbé, 2014). Both studies used a prospective design and

collated incidents of violence from routine hospital records for follow-up periods ranging from between six to twelve months. Abidin et al. (2013) also found that the SAPROF total score interacted with a measure of risk factors suggesting that the protective factors buffered the impact of the risk factors.

An additional two studies have investigated the predictive validity of the SAPROF in adolescents who had a history of sexual offending (Klein, Rettenberger, Yoon, Köhler, & Briken, 2015; Zeng, Chu, & Lee, 2015). These studies reported mixed results; neither found a significant relationship between protective factors and sexual violence and only one (Klein et al., 2015) reported that protective factors significantly predicted absence of violent recidivism. It is noteworthy that these studies utilised the adult version of the SAPROF and that a subsequent version has recently been developed for use with adolescents aged 12 to 18 years old (de Vries Robbé, Geers, Stapel, Hilterman, & de Vogel, 2015).

In a recently published study, an increase in protective factors following inpatient treatment was found to be associated with an absence of violence in the community in a sample of male forensic psychiatric patients (de Vries Robbé, de Vogel, Douglas, & Nijman, 2015). This is the only SAPROF study to look at change in the presence of protective factors in relation to violence risk.

Most of the published studies on the SAPROF have been conducted by the authors of the tool and may therefore be susceptible to authorship bias (Singh, Grann, & Fazel, 2013). In addition, most of these studies have been conducted in the same setting in which the tool was initially developed and validated. Therefore, despite the SAPROF being increasingly used in clinical practice, the validity and

generalisability of the tool has yet to be firmly established. The authors of the tool highlight: “the tool is still relatively new and the predictive value of its protective factors needs to be investigated further in different patient and offender samples to confirm their generalisability” (de Vries Robbé, de Vogel, Douglas, & Nijman, 2015, p. 54).

Aims of the Present Study

The present study aimed to examine the predictive and incremental validity of the SAPROF within a forensic mental health inpatient setting. It was hypothesised that the SAPROF would predict the absence of violent behaviour within the hospital and that the SAPROF and the overall level of risk (i.e., the SPJ risk estimate) would have incremental validity over the assessment of risk factors alone.

Risk factors were assessed using the recently updated Historical, Clinical and Risk Management – 20 (HCR-20^{V3}; Douglas, Hart, et al., 2013) SPJ guidelines; therefore, a secondary aim of the study was to explore the predictive validity of the HCR-20^{V3} and to consider the utility of the SAPROF when combined with the HCR-20^{V3}.

Method

Setting

The State Hospital provides a high secure forensic mental health service for Scotland and Northern Ireland. Patients are legally detained in the hospital due to their “dangerous, violent or criminal propensities” (The State Hospitals Board For

Scotland, 2014, p. 5). The hospital aims to rehabilitate patients (through treatment and interventions targeting mental health and criminogenic needs) to ensure safe transfer to lower levels of security. Violence risk assessment and management planning based on the SPJ approach is well established within the care and treatment planning process for all patients in the hospital (Vojt, Slesser, Marshall, & Thomson, 2011).

Participants

A total of 129 male patients were detained in the hospital at the beginning of the data collection period (April 2014). Patients were eligible for inclusion in the study if they had presented a risk of interpersonal (non-sexual) violence; were aged 18 years or over; had sufficient information within their case files to reliably rate the measures; and had been resident within the hospital for at least two years (to allow a sufficient follow-up period). Seventy five patients (58.1%) met the inclusion criteria. Of the 54 patients who were excluded from the study, 59.3 percent (*n* = 32) were excluded on the basis of being resident in the hospital for less than two years and 40.7 percent (*n* = 22) were excluded on the basis of insufficient file information.

The average age of patients included in the study was 39.44 years (*SD* = 11.28, range 20 - 64) at the beginning of the follow-up period and the average length of time patients had been detained in hospital was 5.54 years (*SD* = 6.86, range 1.1 – 30). Most patients (*n* = 62, 82.7%) had a primary diagnosis of schizophrenia or other psychotic disorder. Other primary diagnoses included learning disability (*n* = 6, 8.0%), personality disorder (*n* = 3, 4.0%), bipolar disorder (*n* = 2, 2.7%), obsessive

compulsive disorder (*n* = 1, 1.3%) and depressive disorder (*n* = 1, 1.3%). Co-morbidity was prevalent with 49.3 percent (*n* = 37) having more than one diagnosis; the most frequent secondary diagnosis for these patients related to substance misuse (*n* = 16, 43.2%) or personality disorder (*n* = 14, 37.8%).

Most patients had a history of violent or aggressive behaviour; 92.0 percent (*n* = 69) had engaged in violence which had not resulted in a formal conviction, 77.3 percent (*n* = 58) had been physically aggressive in either inpatient or custodial settings and 81.3 percent (*n* = 61) were noted to have previous convictions for violence with the majority of these (*n* = 52, 85.2%) rated as serious (i.e. resulting in injury which required treatment). Many patients (*n* = 46, 61.3%) had been convicted or charged with murder or attempted murder and 65.3 percent (*n* = 49) had been convicted or charged with offences involving weapons. Only 21.3 percent (*n* = 16) of the sample had been convicted or charged with sexual offences, however 48 percent (*n* = 36) were noted to have behaved in a sexually inappropriate or aggressive way in inpatient or custodial settings (for example, indecent exposure and inappropriate touching). In terms of other offending behaviour, theft (*n* = 49, 65.3%) and minor offences such as breach of the peace and vandalism (*n* = 60, 80.0%) were also common.

Measures

Demographic information. Demographic information relating to age, diagnosis and forensic history was extracted from case files and recorded using a data collection form designed for the study (Appendix E).

HCR-20^{V3}. The Historical Clinical Risk Management - 20 (Version 3) (Douglas, Hart, et al., 2013) is an SPJ tool for the assessment of interpersonal violence risk in adults aged 18 years and over. The authors of the HCR-20^{V3} highlight that the tool can be used in a variety of settings, including inpatient forensic psychiatric settings, where there is a legal or clinical need to evaluate violence risk. The tool contains 20 risk factors which have an established empirical association with violence and are divided into three temporal domains: the Historical scale includes 10 items which reflect history of violence and past psychosocial functioning; the Clinical scale contains five items reflecting current psychosocial functioning; and the Risk Management scale contains five items pertaining to anticipated future psychosocial adjustment. Items are rated in terms of whether they are present for the individual being assessed and also whether they are relevant to future violence and risk management. Some items contain sub-categories which can be rated to capture the complexity of the item. The present study focused solely on presence ratings for items. The ratings which reflect the presence of risk factors within the Historical scale are relatively static, whereas Clinical and Risk Management items are regarded as dynamic and amenable to change. Presence is coded using a three-level response format; for research purposes only, each level is assigned a numerical value where 2 = definitely present; 1 = possibly or partially present; and 0 = not present. Ratings

are integrated using professional judgment to estimate the overall risk of violence, however the authors also note that "generally the more risk factors that are present and relevant, the higher the risk of future violence" (Douglas, Hart, et al., 2013, p. 62). Hence, in research, often the overall total and domain scores are included in statistical analysis.

The previous version of the HCR-20 (version 2) was widely used in clinical practice (Hurducas et al., 2014) and inter-rater reliability and predictive validity were good (for example, Douglas et al., 2003; Strand, Belfrage, Fransson, & Levander, 1999). A meta-analysis of the predictive validity of the HCR-20 for inpatient aggression indicated effect sizes ranging from d = 0.423 (for the Historical Scale) to d = 1.166 (for the summary risk judgment) (O'Shea, Mitchell, Picchioni, & Dickens, 2013). Campbell, French, and Grendreau (2009) concluded in their meta-analytic study of violence risk assessment tools that the HCR-20 produced the largest mean effect size for institutional violence. Although validation studies of version 3 are relatively limited at present, a number of pilot studies have been conducted (Douglas, Hart, et al., 2013). Doyle et al. (2014) reported good inter-rater reliability for the total and sub-scales of the HCR-20^{V3} (ranging from .90 to .93) when rated based on collateral interview and file information. They also found that the HCR-20^{V3} significantly predicted violence in patients discharged from medium secure forensic psychiatric services in England and Wales with a six to twelve month follow-up period. Strub, Douglas, and Nicholls (2014), reported that version 2 and version 3 ratings correlated highly in a civil psychiatric and offender sample and that

the SPJ risk estimates had good predictive validity with an AUC of .73 at six to eight month follow-up.

SAPROF. The Structured Assessment of Protective Factors (de Vogel et al., 2012) is a 17 item tool originally developed for use with males who have a history of violence and mental disorder. The SAPROF comprises three domains: the Internal scale includes five items focusing on personal characteristics; the Motivational scale includes seven items associated with the individual's motivation to participate in society in a positive manner and engage with treatment; and the External scale includes five items which focus on aspects of the individual's social network and professional management which can exert an external influence and reduce violence risk. Each item is rated on a three-point scale to reflect the degree to which it is present where 2 = clearly present; 1 = may be present or is present to some extent; and 0 = clearly absent.

The SAPROF also instructs assessors to make two SPJ estimates. The Final Protection Judgment (FPJ) is the extent to which the protective factors identified using the SAPROF have a reducing effect on risk of future violent behaviour (i.e. the relevance of the protective factors in the individual case) and the Integrative Final Risk Judgment (IFRJ) is the overall SPJ risk estimate based on the SAPROF and the other risk assessment tools which have been used. Both estimates are rated as low, moderate, or high and require the assessor to interpret and integrate the available information using their professional judgment. The SAPROF has been shown to correlate with protective factors assessed in other SPJ risk assessment tools (Abiden et al., 2013; Klein et al., 2015). Interrater reliability is generally good and for the

total SAPROF score ranges from ICC = .65 (Zeng et al., 2015) to .92 (Klein et al., 2015). The total score has been shown to predict absence of violence; in de Vries Robbé's (2014) study of inpatient aggression, the SAPROF total score had an AUC of .76. In addition, de Vries Robbé et al. (2011) report that the SAPROF total, FRJ, IFRJ and the HCR-20 total minus SAPROF total score (coded based on file information) were all significantly associated with violence in forensic psychiatric patients discharged from hospital with AUC values ranging from .65 to .85.

Outcome measure. The outcome measure in the present study was violence based on the HCR-20^{V3} definition: "actual, attempted, or threatened infliction of bodily harm [including physical and serious psychological harm] on another person." (Douglas, Hart, et al., 2013, p. 36). Incidents of violence were extracted from an electronic database used by staff within the hospital to record all adverse incidents. Recorded incidents which were consistent with the HCR-20^{V3} definition of violence were categorised in this study as physical, verbal or sexual with an overall category of 'any violence' combining all three. Where incidents included multiple types of violence, the incident was categorised based on the type of violence that was likely to result in more harm (for example, an incident which included both verbal and physical violence was typically coded as physical violence). Physical violence included assaults as well as attempted assaults where staff had successfully intervened. Severity of physical violence was also noted as either minor, moderate, or severe using the definitions proposed by Johnstone and Cooke (2008); minor physical violence included attempted violence, moderate typically included violence with physical contact (for example, punching and kicking) and severe included

physical injury requiring treatment. Due to difficulties in interpreting verbal statements based on recorded information, only incidents where there were noted to have been explicit threats to harm were coded as verbal violence. Sexual violence was conceptualised more broadly due to the expected low base rate and included any behaviour or verbal comments which had sexual content and which were likely to result in physical or psychological harm. Based on the information available, a number of incidents logged on the database did not meet the definition for violence, however had nonetheless required staff intervention or caused disruption within the hospital. A fourth category labelled 'disruptive behaviour' was therefore also included to capture these incidents (which included destruction to property or behaving in an abusive, hostile or aggressive manner). The presence of each type of violence or disruptive behaviour (a dichotomous response) and the total number of incidents was recorded during data collection. In addition, the severity rating for the most severe incident of physical violence the patient engaged in during the follow-up period, the target of violent incidents (for example staff, patients or visitors), and whether incidents of violence and disruptive behaviour occurred within the first or second half of the follow-up period was also noted.

Procedure

Ethical approval. Ethical approval for the study was obtained from the West of Scotland Research Ethics Service. Approval to conduct the study within The State Hospital and to access patient information was obtained from the hospital's Research Committee and Caldicott Guardian (see Appendix F).

Sources of information. The HCR-20^{V3} and SAPROF were rated retrospectively from comprehensive file information dated prior to the beginning of the follow-up period. The file information included a case file review which summarised relevant information in medical, psychology, social work and prison files and was completed for the purposes of violence risk assessment within the hospital by an assistant or trainee clinical psychologist. In addition to the case file review, information in key documents finalised following completion of the case file review was also considered. These key documents comprised of care and treatment plans (which included updates by multidisciplinary professionals such as psychiatrists, nurses, psychologists, occupational therapists and social workers) and, where available, evidence documents for violence risk assessments (predominantly based on version 2 of the HCR-20).

Data collection. Data collection took place between April 2014 and May 2015 using a pseudo-prospective design. The HCR-20^{V3} and SAPROF were rated by the author prior to collection of the outcome data from the follow-up period; therefore ratings were made 'blind' to the violence outcome. The author was familiar with the cases of 18 patients (24.0%) from previous clinical practice. The author is trained in the use of both tools and has expertise and experience of conducting SPJ violence risk assessments.

There were two key time frames: the first related to the period during which information was reviewed to rate the HCR-20^{V3} and SAPROF items (the assessment period) and the second related to the period during which incidents of violence and disruptive behaviour were noted (the follow-up period). Guidelines within the tool

manuals indicate that dynamic items are typically rated based on the previous six to twelve months and assessments are generally considered valid for one year from completion. The dates of the two time frames varied for each individual patient and were determined based on the dates of the key documents that were reviewed. The case file review provided relevant historical information and the date of the first care and treatment plan following completion of the case file review was used to establish the beginning of the assessment period. The follow-up period began immediately following the 12 month assessment period. This method maximised the comprehensiveness and continuity in file information and ensured that only information available prior to the beginning of the follow-up period was used to rate the tools. The length of time between the date of the final document reviewed during the assessment period and the beginning of the follow-up period ranged from one day to 243 days (*M* = 81 days, *SD* = 64).

For both the HCR-20^{V3} and the SAPROF, domain scores and total scores were calculated by summing the item ratings. In addition, similar to previous validation studies of the SAPROF, a variable comprising of the HCR-20^{V3} total score minus the SAPROF total score (HCR-20^{V3} total – SAPROF total) was calculated to reflect "violence risk…counterbalanced by the available protection" (de Vogel et al., 2012, p. 31). The IFRJ was rated with respect to the risk of violence within the hospital setting.

Interrater reliability. Both the HCR-20^{V3} and the SARPOF require a degree of knowledge and experience in violence risk assessment to rate and are generally used by clinicians; the availability of a second-rater to explore interrater reliability

was therefore limited. Two cases were selected at random and rated by a qualified clinical psychologist who has experience in conducting SPJ violence risk assessment and is familiar with the tools and has used them in clinical practice. Douglas, Hart, et al. (2013) highlight that a small number of ratings can result in variable estimates of interrater reliability, therefore rather than comparing domain and total scores, Cohen's κ was calculated to determine the level of agreement in ratings for individual items. For the HCR-20^{V3} there was disagreement on eight ratings (20.0%) with only one rating differing by more than one point. The level of agreement between the two raters for the HCR-20^{V3} was κ = .66, $p < .001$, which is regarded as a substantial level of agreement (Landis & Koch, 1977). Analysis of interrater reliability for the SAPROF excluded three of the External scale items as these relate to professional care and aspects of the care environment and are therefore rated the same for all patients. Nine (32.1%) ratings differed with only one differing by more than one point. There was a moderate level of agreement between the two raters for the SAPROF (κ = .45, $p = .001$). It was not possible to statistically analyse the level of agreement for the SPJ estimates (FPJ and IFRJ) due to the small sample, however differences were noted for three of the four ratings; discrepancies were between low and moderate or moderate and high ratings. All item and SPJ risk estimate discrepancies were discussed and a consensus rating used in the analysis. Where consensus could not be reached between the author and second-rater, the evidence for each rating was discussed with a third psychologist who made the final decision. For 64.3 percent of the disputed ratings, the consensus rating or third psychologist's rating was consistent with the author's initial rating.

Statistical Analyses

All statistical analyses were conducted using IBM SPSS Statistics (version 21.0.0.0). Data screening to check for accuracy of data entry was conducted by reviewing descriptive frequencies and cross-checking the data entered for 20.0 percent of cases (*n* = 15) selected at random.

Omitted items. The mean number of items omitted per patient across both the HCR-20^{V3} and the SAPROF was 1.8 (*SD* = 1.1). The most frequently omitted items were Financial Management (*n* = 52, 69.3%) and Intelligence (*n* = 36, 48%) (in the SAPROF) and Personality Disorder (*n* = 29, 38.7%) (in the HCR-20^{V3}). Intelligence and Personality Disorder were generally omitted due to a lack of formal assessment required to rate these items. Financial Management was rarely commented on in patient case files and may reflect limited relevance of this item in secure setting where access to money is restricted and monitored. Due to the high number of omitted ratings, these three items were excluded from the domain and overall total scores for all patients. A further fifteen ratings (0.7% of the remaining ratings) were omitted for 20.0 percent of patients (*n* = 15) (for the items Traumatic Experiences, Secure Attachment in Childhood, Empathy, Self-Control, Attitudes towards Authority, and Life Goals). Individual item ratings were not replaced, however the domain scores were pro-rated based on the mean score from the rated items (Chavance, 2004; Fox-Wasylyshyn & El-Masri, 2005).

0 Analyses. Descriptive statistics were conducted for the HCR-20^{V3} and SAPROF scores. The prevalence and characteristics of violence within the sample was also

explored to provide base rates of violence and facilitate comparisons with other populations.

Initial analyses using the Kolmogorov-Smirnov test suggested that the HCR-20^{V3} total scores ($D(75) = 0.13$, $p = .002$) and SAPROF total scores ($D(75) = 0.15$, $p < .001$) were not normally distributed. Levene's test indicated that the variances were significantly different in the violent and non-violent group for both the HCR-20^{V3} ($F(1, 73) = 4.93$, $p = .03$) and SAPROF ($F(1, 73) = 10.31$, $p = .002$) total scores. Therefore, non-parametric tests were used in statistical analyses.

To explore the relationship between risk factors, protective factors, the FPJ and IFRJ, and different types of violence, Spearman's correlation coefficients were calculated. Due to the multiple comparisons, a Bonferroni corrected *p*-value was applied (.05/105 = corrected *p* is .0004). In addition, the presence of risk and protective factors in patients who engaged in any type of violence during the follow-up period and those who had not was compared; a Mann-Whitney test was conducted to compare the HCR-20^{V3} and SAPROF total scores between these groups.

Receiver Operating Characteristic (ROC) curve analyses were used to examine the predictive validity of risk and protective factors and SPJ estimates to predict all types of violence and disruptive behaviour. Mossman (1994) recommended ROC analysis to evaluate violence prediction and ROC curve analysis is now widely used in predictive validity research for violence risk assessment tools (Singh, Desmarais, & Van Dorn, 2013). The ROC curve is a plot of the true and false positive rates for the tool and the area under the curve (AUC) value that is derived from the ROC

curve reflects the likelihood of the assessor rating a randomly selected violent person as more violent than a randomly selected nonviolent person. Therefore, in assessing the predictive validity of the SAPROF, the AUC value is the probability that a randomly selected individual who was not violent would score higher on the SAPROF than a randomly selected individual who was violent. Thus, an AUC value of .70 would mean that a randomly selected individual from the nonviolent group would have a higher SAPROF score 70 percent of the time when compared to a randomly selected individual from the violent group. AUC values range from 0 to 1; with .5 regarded as a chance prediction and a value of 1 reflecting a perfect (accurate) prediction. In the ROC curve analysis, the HCR-20^{V3} domain and total scores, HCR-20^{V3} total – SAPROF total variable and IFRJ aimed to predict the presence of violence. The SAPROF domain and total scores and the FPJ aimed to predict the absence of violence.

Hierarchical logistic regression analyses explored the incremental validity of protective factors and the IFRJ over risk factors in the prediction of any violence (incorporating physical, verbal and sexual violence) and disruptive behaviour. Risk factors were represented by summing the HCR-20^{V3} Clinical and Risk Management scale scores to derive an HCR-20^{V3} dynamic variable as the ROC curve analysis suggested the Historical scale may not be robust within the sample and both the Clinical and Risk Management scale showed some predictive utility. The direct entry method was used and block order was informed by clinical practice. Given that in practice risk assessment typically involves consideration of risk factors and the SAPROF can only be used in conjunction with existing risk assessment tools, the

HCR-20^{V3} dynamic predictor was entered in the first block followed by the SAPROF total score in the second block. The IFRJ is proposed to integrate both risk and protective factors therefore this was added in the final block. To ease interpretation, within the regression analysis the SAPROF total score was reverse coded so that higher scores reflected the presence of fewer protective factors (and was therefore hypothesised to be associated with the presence of violence). The IFRJ is a categorical variable and was identified as such in the regression analysis. The high and low risk categories were compared to the moderate risk category within the regression; the moderate risk category was identified as the baseline as this was the most frequent rating within the sample and, given the nature of the sample population and setting, it could be argued that all patients presented a degree of risk. Additional analysis indicated that the assumptions had been met for the regression analyses; multicollinearity did not appear to be present and there was a linear relationship between the HCR-20^{V3} dynamic, SAPROF total, and IFRJ predictors and violence.

Finally, post-hoc analyses were conducted to explore the IFRJ categories (high, medium and low). Pearson's chi-square analyses were conducted to explore rates of violence and disruptive behaviour across the IFRJ categories and a Bonferroni corrected *p*-value was calculated (.05/5 = corrected *p* is .01). Kruskal-Wallis tests were conducted to determine whether the IFRJ categories were significantly different in terms of the presence of risk and protective factors (using the HCR-20^{V3} dynamic score, HCR-20^{V3} total score and SAPROF total score). Jonckheere's tests were also conducted to explore trends in the presence of risk and protective factors

across the IFRJ categories. As multiple comparisons were undertaken, a Bonferroni corrected *p*-value was calculated for both these tests (.05/3 = corrected *p* is .017).

Power analysis. Post hoc power analyses were conducted using G*POWER (Faul, Erdfelder, Lang, & Buchner, 2007) to determine the statistical power of the sample to detect a significant difference in the HCR-20^{V3} total score and SAPROF total score between the violent and non-violent groups using non-parametric tests. For the HCR-20^{V3}, the analysis indicated that there was insufficient power (69.0%) to detect the small effect size (*d* = .59) that was found with an alpha level of .05. In contrast, for the SAPROF, analysis indicated the sample had sufficient power (97.0%) to detect the large effect size found (*d* = .93). Results pertaining to the HCR-20^{V3} should therefore be interpreted with caution.

Results

Risk and Protective Factors

Descriptive analysis of the prevalence and distribution of risk and protective factors within the sample indicated that patients tended to have several risk factors (particularly within the Historical scale of the HCR-20^{V3}) and relatively few protective factors (Table 2.1). There was however evidence of a range of scores across the sample for the domains as well as the HCR-20^{V3} and SAPROF total scores. The full range of response options was also used for the majority of items across both tools (exceptions to this were Previous Violence, Secure Attachment in Childhood, Intimate Relationships and the three factors within the External domain

of the SAPROF that received the same rating for all patients). Therefore, whilst there was tendency towards increased numbers of risk factors and lower numbers of protective factors, there was sufficient variability to suggest that both the HCR-20^{V3} and SAPROF could have utility within the population and differential validity.

Analysis of the relationship between protective and risk factors indicated that as the number of risk factors present increased, the number of protective factors present decreased (see Appendix G, Table G.1). The total HCR-20^{V3} score showed a significant negative correlation with the total SAPROF score (r_s = -.55, p < .001). Similar results were found for the relationships involving the domains with significant correlations (following application of the Bonferroni correction) in the medium to large effect size range (Cohen, 1992) (ranging from r_s = .54 between the Clinical and Internal scales to r_s = -.61 between the Clinical and Motivational scales). The Historical domain did not significantly correlate with any of the SAPROF domains or the total SAPROF score; the direction of the relationship was also inconsistent, however effect sizes were small (ranging from r_s = -.01 to .16).

All HCR-20^{V3} and SAPROF scales significantly correlated with the FPJ and IFRJ in the expected direction except the Historical scale of the HCR-20^{V3} and the External scale of the SAPROF. The strongest correlations with the FPJ were the Motivational scale (r_s = -.77, p < .001) and the SAPROF total score (r_s = -.81, p < .001). For the IFRJ, the Clinical scale (r_s = .68, p < .001) and SAPROF total score (r_s = -.68, p < .001) showed the strongest relationship.

Table 2.1 Descriptive Statistics for the HCR-20^{V3} and SAPROF

	Descriptive Statistics			
Risk and Protective factors	*Mean*	*SD*	*Median*	Range
HCR-20^{V3}				
Historical scale	14.35	2.83	15	6-18
Clinical scale	5.73	2.36	6	0-10
Risk Management scale	4.67	1.83	5	1-9
HCR-20^{V3} total	24.75	4.44	25	8-32
SAPROF				
Internal scale	1.68	1.38	2	0-8
Motivational scale	3.36	2.69	3	0-9
External scale	6.92	0.75	7	6-8
SAPROF total	11.96	3.84	11	6-24
HCR-20^{V3} total – SAPROF total	12.79	7.38	14	-8-24

Note: N = 75. HCR-20^{V3} = Historical Clinical Risk Management-20 (version 3); SAPROF = Structured Assessment of Protective Factors; *SD* = standard deviation. In this study, the possible range of scores on the HCR-20^{V3} Historical scale is 0-18; Clinical scale is 0-10; Risk Management scale is 0-10; and HCR-20^{V3} total is 0-38 (higher scores on HCR-20^{V3} scales indicate greater presence of risk factors). The possible range of scores on the SAPROF Internal scale is 0-8; Motivational scale is 0-12; External scale is 6-10; and SAPROF total is 6-30 (higher scores on the SAPROF scales indicate greater presence of protective factors).

Prevalence and Rates of Violence

Thirty three patients (44.0%) engaged in physical, verbal or sexual violence during the follow-up period and most (*n* = 27, 81.8%) were violent within the first six months. The total number of violent incidents during the follow-up period was 408 and the number of incidents per patient ranged from 0 to 147. Three patients accounted for almost 67.0 percent of all incidents (*n* = 273) and were therefore outliers within the data set. When these three patients were excluded, the mean number of violent incidents per patient was 1.88 (*SD* = 3.66, range 0 – 19). Violent

behaviour was generally directed towards members of staff. Twenty nine patients (38.7%) engaged in physical violence; this was the most frequent type of violence accounting for 68.1 percent (*n* = 278) of all violent incidents. Patients were most likely to engage in physical violence of a moderate severity and only three patients engaged in serious physical violence. Twenty two patients (29.3%) were noted to be verbally violent during the follow-up period with incidents of verbal violence accounting for 27.0 percent (*n* = 110) of all violent incidents. Seven patients (9.3%) behaved in a sexually violent way which accounted for 5.6 percent (*n* = 23) of all violent incidents. Sexually violent incidents typically involved sexualised threats or comments and indecent exposure behaviour. In addition to incidents of violence, 30 patients (40.0%) were noted to have behaved in a disruptive way. In total, 124 incidents of disruptive behaviour were recorded and, similar to violent behaviour, incidents were most likely to occur within the first six months of the follow-up period.

Relationship between Risk and Protective Factors and Violence

Across the total and domain scores of the HCR-20^{V3} and SAPROF, the violent group consistently scored higher on the HCR-20^{V3} (indicating increased presence of risk factors) and lower on the SAPROF (indicating fewer protective factors). For the HCR-20^{V3} total score, the difference between the violent group (mean = 26.14, *SD* = 2.97; median = 26, range 20 – 32) and non-violent group (mean = 23.67, *SD* = 5.1; median = 25, range 8 – 31) was significant (*U* = 501.5, *z* = -2.05, *p* = .04). Similarly, for the total SAPROF score, the violent group (mean = 10.17, *SD* = 2.66; median =

10, range 6 – 20) and non-violent group (mean = 13.37, *SD* = 4.05; median = 13, range 7 – 24) were significantly different (U = 355.5, z = -3.62, $p < .001$).

The direction and strength of the relationship between the risk and protective factors and presence of violence or disruptive behaviour was explored (see Appendix G, Table G.1). The Historical scale correlated negatively with all types of violence and disruptive behaviour; whilst this would suggest that having a higher number of risk factors on this scale was associated with a reduced likelihood of violence, the strength of the relationship was small (all less than r_s = .20) and none reached statistical significance. The total HCR-20^{V3} score and the Clinical and Risk Management scale scores were positively correlated with all types of violence and disruptive behaviour and a small to medium effect was noted. After applying the Bonferroni correction, significant relationships ranged from r_s = .40 (between the Clinical scale and verbal violence and disruptive behaviour categories) and r_s = .44 (between the Risk Management scale and disruptive behaviour).

In relation to protective factors, the SAPROF total and domain scores correlated negatively with all types of violence and disruptive behaviour indicating that the presence of fewer protective factors was associated with increased likelihood of violence. Effect sizes were in the small to medium range. Only the correlation between the total SAPROF score and the any violence category was significant after application of the Bonferroni correction (r_s = -.42).

Overall, whilst increased numbers of risk factors and fewer numbers of protective factors were generally associated with increased likelihood of violence,

the domains appeared to only account for a limited amount of the variance (40 to 44 percent based on statistically significant correlations).

Predictive Validity of HCR-20^{V3}, SAPROF and SPJ Estimates

Results of the ROC curve analysis are presented in Table 2.2. In relation to risk factors, the HCR-20^{V3} total score significantly predicted any violence (AUC = .64, p = .041, 95% CI = .51-.76) and disruptive behaviour (AUC = .70, p = .004, 95% CI = .58-.82) but did not significantly predict the different sub-types of violence. Further, the confidence intervals were large suggesting relatively poor precision. The Historical scale, consistent with the findings of the correlation analyses, had AUC values less than .50 suggesting that the risk factors within this domain were associated with the absence of, rather than presence of, violence. The Clinical scale of the HCR-20^{V3} appeared to be a good predictor of all types of violence and disruptive behaviour; AUC values for the Clinical scale ranged between .66 (p = .024, 95% CI = .48-.77) for physical violence to .83 (p = .004, 95% CI = .74-.93) for sexual violence. The Clinical scale was the only significant predictor (across the HCR-20^{V3} and SAPROF totals and sub-scales) of sexual violence. The Risk Management scale was also a good predictor of most types of violence and disruptive behaviour with significant AUC values ranging from .64 (p = .042, 95% CI = .52-.77) for physical violence to .75 (p < .001, 95% CI = .64-.86) for disruptive behaviour. These results suggest that dynamic risk factors may be good predictors of future inpatient violence, particularly those relating to current psychosocial functioning. However,

Table 2.2 Predictive Accuracy of HCR-20^{V3}, SAPROF and Structured Professional Judgment Estimates for Violence and Disruptive Behaviour

	Outcome									
Risk and protective factors and	Any Violence		Physical Violence		Verbal Violence		Sexual Violence		Disruptive Behaviour	
SPJ estimates	AUC	95% CI	AUC	95% CI	AUC	95% CI	AUC	95% CI	AUC	95% CI
HCR-20^{V3}										
Historical scale	.42	.28-.55	.45	.31-.58	.38	.25-.51	.31	.10-.53	.44	.31-.57
Clinical scale	.71**	.60-.83	.66*	.48-.77	.75***	.63-.87	.83**	.74-.93	.73***	.62-.85
Risk Management scale	.69**	.55-.82	.64*	.52-.77	.65*	.53-.78	.68	.53-.83	.75***	.64-.86
HCR-20^{V3} total	.64*	.51-.76	.59	.47-.72	.63	.50-.75	.60	.41-.80	.70**	.58-.82
SAPROF										
Internal scale	.68**	.56-.80	.66*	.54-.78	.61	.48-.75	.65	.44-.85	.66*	.53-.78
Motivational scale	.70**	.58-.81	.65*	.53-.77	.65*	.52-.77	.62	.47-.78	.68**	.56-.80
External scale	.61	.48-.74	.62	.48-.75	.65*	.51-.79	.64	.42-.86	.64*	.50-.77
SAPROF total	.74***	.63-.86	.71**	.59-.82	.69**	.56-.81	.70	.53-.87	.72***	.60-.84
Final Protection Judgment	.76***	.67-.88	.73***	.61-.84	.72**	.60-.84	.73*	.57-.89	.78***	.68-.88
HCR-20^{V3} total - SAPROF total	.71**	.60-.83	.67*	.55-.79	.67*	.55-.79	.67	.50-.83	.73***	.62-.84
Integrative Final Risk Judgment	.80***	.70-.90	.74***	.63-.85	.79***	.68-.90	.80**	.66-.94	.81***	.72-.91

Note. N = 75. HCR-20^{V3} = Historical Clinical Risk Management-20 (version 3); SAPROF = Structured Assessment of Protective Factors; AUC = area under the curve (from Receiver Operating Characteristic (ROC) curve analysis; CI = confidence interval. The values for the HCR-20^{v3} scales and total, HCR-20^{v3} total – SAPROF total, and Integrative Final Risk Judgment concern the presence of violence. The values for the SAPROF scales and total and Final Protection Judgment concern the absence of violence.
* $p < .05$; * $p < .01$; *** $p \leq .001$ (two-tailed)

similar to the total HCR-20^{V3} score, confidence interval ranges for the Clinical and Risk Management scale had a tendency to be large.

The SAPROF total predicted the absence of all types of violence (except sexual violence) and disruptive behaviour, with AUCs ranging from .69 (p = .012, 95% CI = .56-.81) for verbal violence to .74 (p < .001, 95% CI = .63-.86) for the category any violence, suggesting that higher numbers of protective factors reduce the risk of violent or disruptive behaviour. Similar to the results of the HCR-20^{V3}, confidence intervals were large suggesting limited precision. The External scale of the SAPROF was a poor predictor of absence of most types of violence; this is likely to be due to the limited variability in scores within this domain as three of the items are rated the same for all patients due to the nature of the secure environment. The Internal and Motivational scales appeared to perform similarly to the HCR-20^{V3} Clinical and Risk Management scales and were significant predictors of most types of violence. The HCR-20^{V3} however appeared to be a stronger predictor for verbal violence and disruptive behaviour. Although the Internal and Motivational scales of the SAPROF were relatively consistent across most types of violence, the confidence intervals were large with the lower confidence interval value typically around .50 (i.e., chance level). In contrast, the FPJ based on consideration of the relevance of the SAPROF items for the individual case was a consistent and robust significant predictor across all types of violence and disruptive behaviour with AUC values ranging from .72 (p = .003, 95% CI = .60-.84) for verbal violence to .78 (p < .001, 95% CI = .68-.88) for disruptive behaviour.

The HCR-20^{V3} total – SAPROF total variable significantly predicted all types of violence (except sexual violence) and disruptive behaviour with AUC values ranging from .67 (p = .016, 95% CI = .55-.79) for physical violence to .73 (p = .001, 95% CI = .62-.84) for disruptive behaviour. Confidence intervals were large and around chance at the lower end of the range for physical, verbal and sexual violence. The IFRJ however was highly predictive of the presence of inpatient violence within the sample and appeared to be the strongest and most robust predictor. The IFRJ was significantly associated with all types of violence and disruptive behaviour with AUC values ranging from .74 (p = .001, 95% CI = .63-85) for physical violence to .81 (p < .001, 95% CI = .72-.91) for disruptive behaviour. For the category of any violence, the IFRJ AUC value was .80 (p < .001, 95% CI = .70-.90); therefore a patient selected at random from within the violent group would have a higher risk classification judgment 80 percent of the time compared to a patient selected at random from within the non-violent group. Whilst confidence intervals were large, for the IFRJ the range was .63 or above suggesting a robust effect. IFRJ AUC values and significance levels were also greater compared to the HCR-20^{V3} total – SAPROF total variable which supports the SPJ approach.

Incremental Validity of SAPROF and SPJ Risk Estimate

A hierarchical logistic regression explored whether the SAPROF and IFRJ added to the predictive validity of the dynamic risk factors in the HCR-20^{V3} for the prediction of any violence (Table 2.3). The Clinical and Risk Management items within the HCR-20^{V3} were combined to represent dynamic risk factors as these had been the most

Table 2.3 Hierarchical Logistic Regression for Violence Exploring Incremental Validity of SAPROF Protective Factors and Integrated Final Risk Judgment (IFRJ) over HCR-20^{V3} Dynamic Risk Factors

	Regression Coefficient			Odds Ratio		Model			
Model	*b*	SE	Wald	Exp (*β*)	95% CI	-2 Log Likelihood	Model χ^2 (*df*)	R^2_{CS}-R^2_N	Change (from previous block) χ^2 (*df*)
Constant	-0.24	.23	1.08	.79		102.89			
Block 1						89.02	13.87(1)***	.17 -.23	13.87(1)***
HCR-20^{V3} dynamic	0.28	.88	10.43***	1.33	1.12-1.57				
Block 2						85.79	17.10(2)***	.20-.27	3.23(1)
HCR-20^{V3} dynamic	0.16	.11	2.06	1.17	0.94-1.46				
SAPROF total	0.18	.11	2.82	1.20	0.97-1.48				
Block 3						76.43	26.46(3)***	.30-.40	9.36(1)**
HCR-20^{V3} dynamic	-0.01	.13	0.001	1.00	0.78-1.27				
SAPROF total	0.08	.12	0.46	1.08	0.86-1.36				
Integrative Final Risk Judgment			8.16*	5.09	1.60-16.23				
Low vs Moderate risk	-1.16	.92	1.61	0.31	0.52-1.88				
High vs Moderate risk	1.92	.75	6.44*	6.79	1.55-29.78				

Note. *N* = 75. HCR-20^{V3} = Historical Clinical Risk Management-20 (version 3); SAPROF = Structured Assessment of Protective Factors; SE = standard error; CI = confidence interval; R^2_{CS} = Cox & Snell; R^2_N = Naglekerke. HCR-20^{V3} dynamic includes Clinical and Risk Management scale risk factors. SAPROF total is reverse scored.
* $p < .05$; * $p < .01$; *** $p \leq .001$

predictive domains within the ROC curve analyses. Similarly, the focus of the regression was on predicting any violence due to the variability found in the ROC curve analyses when considering different types of violence separately.

Dynamic risk factors (Block 1) significantly predicted any type of violence (χ^2 = 13.87, $p < .001$, R^2 = .17-.23) and correctly classified 70.7 percent of cases (as violent or non-violent). When the SAPROF was added (Block 2), the model was also significant (χ^2 = 17.10, $p < .001$, R^2 = .20-.27). Although there was some improvement in the model in that there was less unexplained variance, this improvement did not reach statistical significance (change χ^2 3.23, p = .07) and only 68.0 percent of cases were correctly classified; therefore adding protective factors did not appear to significantly improve the prediction of violence from the dynamic risk factors alone. Further, neither dynamic risk factors nor protective factors were significant predictors in the model and the lower ends of the confidence intervals were slightly below one suggesting that they were not robust predictors. Correlational analysis however indicated that HCR-20 dynamic risk factors were highly correlated with the SAPROF total (reverse scored) (r_s = .72, $p < .001$); therefore, whilst it may initially appear that protective factors did not add predictive power, the degree of correlation suggests it is difficult to ascertain what predictor is contributing to the model. The odds ratio for the SAPROF total was slightly higher (1.20) than that for the HCR-20^{V3} dynamic factors (1.17) indicating that a decrease in the presence of protective factors led to a greater increase in the probability of violence than an increase in presence of dynamic risk factors.

Adding the IFRJ (Block 3) resulted in the model with the best fit (χ^2 = 26.46, p < .001, R^2 = .30-.40); this was a significant improvement from the risk and protective factors alone (change χ^2 = 9.36, p = .009) and the IFRJ overall was significant (Wald = 8.16, p = .017). The difference between moderate and low risk was negatively associated with violence indicating that a shift in IFRJ rating from moderate to low risk was associated with less violent behaviour. This however did not reach statistical significance (b = -1.62, SE = .92, Wald = 1.61, p = .21); this could reflect a lack of precision within the moderate risk category or the relatively low sample size within each risk category. The difference between moderate and high risk did significantly predict violence and was the only significant predictor in the model (b = 1.92, SE = .75, Wald = 6.44, p = .011) suggesting that an IFRJ of high risk was a strong predictor of violence. Further, the odds ratio indicated that with an increase in estimated risk level from moderate to high risk, the odds of an individual engaging in violence were 6.79 times higher. Dynamic risk factors, protective factors and the SPJ estimate of risk correctly classified 77.3 percent of cases. It however only accounted for up to 39 percent of the variance in violent behaviour (R^2 = .29-.39).

Similar results were obtained for a hierarchical logistic regression exploring the prediction of disruptive behaviour, however the HCR-20^{V3} dynamic risk factors remained a significant predictor when the SAPROF protective factors were added to the model. The model incorporating HCR-20^{V3} dynamic risk factors, the SAPROF and the IFRJ provided the best fit (-2 Log Likelihood = 68.37, χ^2 (4) = 32.58, p < .001, R^2 = .35-.48) and correctly classified 76.0 percent of cases. The IFRJ was not significant within this model (Wald = 3.28, p = .19), however the moderate vs high risk

category predictor did approach statistical significance (b = 1.36, SE = .75, Wald = 3.28, p = .07).

SPJ Risk Estimates

Given the high AUC values for the IFRJ and incremental predictive validity of the IFRJ in predicting violence, post-hoc analyses were conducted to explore the IFRJ categories. Most patients (n = 31, 41.3%) were rated as moderate risk of engaging in inpatient violence, 26 (34.7%) were judged to be high risk and 18 (24.0%) were rated as low risk.

Table 2.4 shows the rates of violence across each IFRJ category; across all types of violence and disruptive behaviour, rates of violence (based on the number of patients engaging in violence) were highest within the high risk IFRJ category and lowest in the low risk IFRJ category. The false positive rate was low with only two patients rated as low risk engaging in any violence; these patients engaged in one incident of violence each which was of a minor or moderate severity.

Analysis indicated that the rate of violence was associated with the IFRJ categories for all types of violence and disruptive behaviour (any violence: $\chi^2(2) = 23.90$, $p < .001$; physical violence: $\chi^2(2) = 14.13$, $p = .001$; verbal violence: $\chi^2(2) = 18.24$, $p < .001$; sexual violence: $\chi^2(2) = 9.02$, $p = .015$; and disruptive behaviour: $\chi^2(2) = 24.12$, $p < .001$). Sexual violence was not statistically significant after application of the Bonferroni corrected p value (p = .01); this is likely to be due to low expected cell frequency values as a result of the low base rate of sexual violence within the sample. Based on the standardised residuals, for all types of

Table 2.4 Rates of Violence and Disruptive Behaviour across Integrative Final Risk Judgment Categories

	Integrative Final Risk Judgment categories		
	High (*n* = 26)	Moderate (*n* = 31)	Low (*n* = 18)
Type of violence	*N* (%)	*N* (%)	*N* (%)
Any violence (*n* = 33)	21 (63.6%)	10 (30.3%)	2 (6.1%)
Physical violence (*n* = 29)	17 (58.6%)	10 (34.5%)	2 (6.9%)
Verbal violence (*n* = 22)	15 (68.2%)	7 (31.8%)	0
Sexual violence (*n* = 7)	6 (85.7%)	1 (14.3%)	0
Disruptive behaviour (*n* = 30)	19 (63.3%)	11 (36.7%)	0

violence and disruptive behaviour, the high risk category was significantly associated with violence with significantly more patients engaging in violence than expected in this category (this ranged from $z = 2.2$, $p < .05$ for physical violence to $z = 2.8$, $p < .01$ for any violence). A similar trend was evident for the low risk category with significantly fewer patients engaging in violence than expected for any violence, verbal violence and disruptive behaviour (with scores ranging from $z = 2.1$, $p < .05$ for any violence to $z = 2.2$, $p < .01$ for disruptive behaviour). For all types of violence and disruptive behaviour, the moderate IFRJ rating was not significantly associated with whether the patient engaged in violent behaviour or not suggesting that the precision of this category is relatively poor. In relation to the category any violence, the odds of a patient being violent were 33.6 times higher for patients rated as high risk compared to those rated as low risk. These findings are consistent with the results of the logistic regression which highlighted that a shift from moderate to high risk was the strongest predictor of a patient engaging in violence.

Table 2.5 Descriptive Statistics for HCR-20^{V3} and SAPROF across Integrative Final Risk Judgment Categories

	Integrative Final Risk Judgment Categories					
	High (*n* = 26)		Moderate (*n* = 31)		Low (*n* = 18)	
	Mean (*SD*)	Median (range)	Mean (*SD*)	Median (range)	Mean (*SD*)	Median (range)
HCR-20^{V3} total	26.57 (2.70)	26.75 (23-31)	25.42 (3.22)	25 (18-32)	20.72 (5.73)	21 (8-29)
HCR-20^{V3} dynamic	13.42 (1.82)	13 (10-18)	9.97 (2.88)	10 (2-16)	6.78 (3.15)	7 (2-13)
SAPROF total	8.87 (1.59)	9 (6-12)	12.61 (3.19)	12 (7-20)	15.32 (3.90)	15 (7-24)

Note: HCR-20^{V3} = Historical Clinical Risk Management-20 (version 3); SAPROF = Structured Assessment of Protective Factors; *SD* = standard deviation. In this study, the possible range of scores on the HCR-20^{V3} total is 0-38; HCR-20^{V3} dynamic is the Clinical and Risk Management scales combined and has a possible range of 0-20 (with higher scores on the HCR-20^{V3} indicating greater presence of risk factors). The possible range of scores on SAPROF total is 6-30 (higher scores on the SAPROF scales indicate greater presence of protective factors).

The pattern of risk and protective factors was also consistent across the risk categories with higher risk categories having significantly more risk factors and fewer protective factors (Table 2.5) (HCR-20^{V3} total: $H(2) = 15.69$, $p < .001$; $J = 1304.50$, $z = 3.82$, $p < .001$, $r = .44$; HCR-20^{V3} dynamic: $H(2) = 39.37$, $p < .001$; $J = 1583$, $z = 6.57$, $p > .001$, $r = .80$; SAPROF total: $H(2) = 35.45$ $p < .001$; $J = 288.50$, $z = -6.18$, $p < .001$, $r = .71$ with Bonferroni corrected $p = .017$). Although there was considerable overlap in the ranges of scores for each IFRJ category, the effect sizes found for the HCR-20^{V3} dynamic score ($r = .80$) and SAPROF total score ($r = .71$) were substantial suggesting this is a robust finding.

Discussion

Predictive Validity of Protective Factors for Violence Risk

This study aimed to explore the predictive validity of protective factors for violence within a forensic mental health inpatient setting using the SAPROF. The results supported the hypothesis that the presence of protective factors predicts the absence of inpatient violence; increased numbers of protective factors were associated with reduced likelihood of inpatient violence with AUC values ranging from .69 to .78. The SAPROF total score was significantly associated with the absence of all types of violence (except sexual violence) and disruptive behaviour and SPJ risk estimates of the overall protection offered by the protective factors (the FPJ) were significantly associated with the absence of all types of violence and disruptive behaviour. In predicting the absence of any violence, the SAPROF total AUC was .74 and the FPJ was .76. The results were therefore comparable to the findings of de Vries Robbé (2014) who also explored protective factors for inpatient aggression and reported an AUC for the SAPROF total of .76 and .74 for the FPJ.

None of the SAPROF subscales or total score significantly predicted the absence of sexual violence. This may have been due to the relatively low base rate for sexual violence within the sample and broad definition used which included relatively minor forms of inappropriate sexualised behaviour. It is also possible that sexual aggression within inpatient settings is qualitatively different and may require consideration of different protective factors that are not included in the SAPROF.

The HCR-20^{V3} was also used in the present study and the predictive validity of the total and domain scores varied. Although the HCR-20^{V3} total score predicted the

category of any violence the AUC was relatively low at .64 and the HCR-20^{V3} total score failed to significantly predict any of the sub-types of violence. However, it was apparent from analysis of the HCR-20^{V3} domains that the Historical scale was a particularly poor predictor whilst the dynamic Clinical and Risk Management scales fared better with significant AUC values ranging from .64 to .83. Although previous meta-analytic reviews would suggest that historical and static factors are often the strongest predictors of violent behaviour (Bonta, Law, & Hanson, 1998; Campbell et al., 2009), studies utilising the previous version of HCR-20 have also found that the dynamic risk factors had more predictive validity than the historical factors (Belfrage, Fransson, & Strand, 2000; O'Shea et al., 2013; Strand et al., 1999); all of these studies highlight limited variability in Historical scale risk factors within the samples. This was also true of the present sample where, due to the nature of the population and secure setting, the majority of patients presented with a significant number of historical risk factors. The results of the HCR-20^{V3} should be interpreted with caution for a number of reasons. Firstly, there was limited statistical power in relation to the HCR-20^{V3} which is likely to be due to the homogeneity within the sample. Secondly, in the present study, the Personality Disorder item in the Historical scale of the HCR-20^{V3} was excluded due to limited information; personality disorder has been shown to be associated with increased risk for violent and antisocial behaviour (Yu, Geddes, & Fazel, 2012) and therefore it is possible that the predictive accuracy of the Historical scale was reduced by excluding this item. Finally, only presence ratings were noted in the present study and it is possible that

consideration of the relevance of the risk factors may enhance the predictive validity of the HCR-20^{V3}.

It was hypothesised that the SAPROF would have incremental validity in relation to predictive accuracy when added to the HCR-20^{V3}. The results of the hierarchical regression analyses suggested that although the combined model which included the HCR-20^{V3} dynamic risk factors and SAPROF was significant and there was less unexplained variance than when only risk factors were considered, the SAPROF did not appear to significantly add to the predictive validity of the HCR-20^{V3} for violence and disruptive behaviour within the hospital setting. This may reflect a degree of overlap in the content of some of the items within the HCR-20^{V3} and SAPROF (Guy, 2008). Further, the SAPROF and HCR-20^{V3} were highly correlated which made it difficult to determine the relative contribution of risk and protective factors. Whilst the results did not clearly establish the utility of adding protective factors to the violence risk assessment process in terms of the predictive validity of the assessment, consideration of protective factors may have other benefits in terms of informing treatment by highlighting targets of intervention or facilitating engagement in those being assessed. It is therefore important that the other aspects of protective factors are explored before drawing conclusions on the utility of incorporating protective factors in violence risk assessment practice.

The HCR-20^{V3} total – SAPROF total variable significantly predicted all types of violence except sexual violence, however confidence intervals were large and often around chance level. This would suggest that the relationship between risk and protective factors and underpinning mechanisms between protective factors and

violence may be complex. This is further supported by the correlational analyses which indicated that although risk and protective factors were correlated, they accounted for a relatively small proportion of the variance.

Support was found for the SPJ overall risk estimate. The IFRJ significantly predicted all types of violence and disruptive behaviour with AUC values ranging from .74 (for physical violence) to .81 (for disruptive behaviour). AUC confidence intervals for the IFRJ suggested it had a relatively robust relationship with violence. This is consistent with previous findings; Guy (2008) conducted a meta-analysis of the SPJ approach to violence risk assessment and concluded that SPJ ratings tended to have higher predictive validity compared to total scores. There was also support for the study hypothesis that the SPJ risk estimate would have incremental validity over the HCR-20^{V3} risk factor ratings; the IFRJ significantly added to the predictive validity of the dynamic factors in the HCR-20^{V3} and the protective factors in the SAPROF in relation to violence and disruptive behaviour. In particular, an IFRJ rating of high risk was significantly associated with increased likelihood of violence. IFRJ categories were significantly different in terms of rates of violence and disruptive behaviour and higher risk ratings were associated with significantly more risk factors and fewer protective factors. There is no clear guidance regarding how to derive SPJ risk estimates, however it is likely that the IFRJ ratings incorporated consideration of both risk and protective factors as the HCR-20^{V3} and SAPROF totals were significantly correlated with the IFRJ ratings. Further, as the IFRJ also appeared to be a stronger predictor than the HCR-20^{V3} total – SAPROF total it is possible that the IFRJ was able to capture some of the complexity in the relationship between risk

and protective factors and may also have included aspects associated with formulation and risk scenarios which were not explored in the study. Despite the model which included dynamic risk factors, protective factors and the SPJ risk estimate correctly classifying 77.3 percent of cases, it was noted that this model only accounted for 39 percent of the variance in inpatient violence; other situational and environmental variables may therefore also be important within institutional settings (Welsh, Bader, & Evans, 2013).

Strengths and Limitations

There is clear interest in protective factors and the SAPROF has been implemented in practice despite the relatively limited empirical evidence base. The present study therefore adds to the existing research on the SAPROF as well as highlighting areas where further research is required. There are also no published studies exploring the utility of the SAPROF in combination with the most recent version of the HCR-20 risk assessment tool. Whereas some previous studies exploring the predictive validity of violence risk assessment tools have focused on the total and domain scores, this study also explored the validity of and found support for the SPJ ratings (the FPJ and IFRJ). In particular, high risk ratings were significantly associated with violence; in professional practice where there is a need to effectively target resources and manage the risk of violence, overall SPJ ratings may facilitate and inform decision making processes. Violence risk assessment using the SPJ approach requires expertise and time (Green, Carroll, & Brett, 2010) and the present study explored the incremental validity of including protective factors

which may be important from a pragmatic point of view. Guy (2008) also highlights that many of the SAPROF protective factors are similar in content to the HCR-20 risk factors and it is therefore possible that they could be captured within the process of considering risk factors. This present study highlights that further research is required to establish the utility of incorporating structured assessment of protective factors into the violence risk assessment process.

There are a number of limitations which should also be highlighted. Firstly, the HCR-20^{V3} and SAPROF were scored retrospectively from file information. Although file-based studies are generally acknowledged as acceptable in the initial validation stages of new tools (Douglas, Hart, et al., 2013), in professional practice a combination of different methods such as interview and file information are generally used. Further, although the file information was comprehensive, it was not possible to score some items due to limited information or a lack of formal assessment. There may also have been a tendency for retrospective file information to focus on risk factors as consideration of protective factors in violence risk assessment is relatively new. Further, although the HCR-20^{V3} and SAPROF were coded 'blind' to the outcome, prospective designs are required to robustly establish the temporal sequence required when drawing conclusions about predictive relationships.

The relevance of some of the items in the SAPROF within a secure inpatient setting is also unclear; for example the need for Financial Management may be limited and sustaining an Intimate Relationship may be problematic. There was also no variability in three of the External domain factors due to the secure nature of the

hospital setting. Further, due to the timeframes utilised, all patients had been detained in the hospital for at least one year prior to the beginning of the outcome period, therefore it is not possible to determine whether the SAPROF may have predictive utility during the admission phase which may be characterised by more instability in mental health and therefore an increased risk of violence.

A significant limitation of the present study is that it was not possible to fully assess interrater reliability and discrepancies were noted, particularly in relation to the SPJ risk estimates. As the HCR-20^{V3} and SAPROF was scored by a single rater, potential rater biases and effects were reduced. However, the findings require to be replicated in clinical practice where tools are rated by different raters or by teams. De Vogel and de Ruiter (2004) have also demonstrated that researchers tended to rate the HCR-20 significantly higher than clinicians who were familiar with the individuals being assessed and involved in their care and treatment. Therefore establishing the utility and ecological validity of the SAPROF and HCR-20^{V3} in practice is essential. Similarly, although the SPJ ratings were shown to be associated with violence, this requires to be replicated by other raters. This is particularly important given the limited guidance regarding how SPJ risk estimates are derived; future research may benefit from exploring the processes involved and how professionals integrate risk factors when deriving SPJ risk estimates in order to operationalise and develop guidance in relation to these.

Summary

The results suggested that protective factors assessed using the SAPROF were associated with the absence of violence and disruptive behaviour in a forensic mental health inpatient setting. Whilst the incremental validity of protective factors was not clearly established, the utility of including protective factors in violence risk assessment remains promising. The overall SPJ estimate of risk was a robust and strong predictor of all types of violence and disruptive behaviour in the sample, and is likely to have included consideration of both protective and risk factors. Ratings of high risk were found to be strongly associated with the presence of violence. Further research is required to establish the predictive validity of the SAPROF in clinical practice and the utility of protective factors beyond the prediction of violence.

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Appendices

Appendix A: International Journal of Forensic Mental Health – Instructions for Authors

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Book: Millman, M. (1980). *Such a pretty face.* New York: W.W. Norton.

Contribution to a Book: Hartley, J.T., & Walsh, D.A. (1980). Contemporary issues in adult development of learning. In I.W. Poon (ed.). *Ageing jin the 1980s* (pp. 239-252). Washington, DC: American Psychological Association.

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Appendix B: Systematic Review – Full Search Strategy

Search terms within the systematic review were based on the full and/or abbreviated name of structured professional judgment (SPJ) violence risk assessment tools that included protective factors. Where a tool name or abbreviation was also a common word or name (as in the case of ASSET, START and VERA), these terms were combined with other relevant terms to limit the number of erroneous results. ASSET was combined with "youth justice" as this tool is designed for use with young people in criminal justice settings. START and VERA were combined with the variable proximity search term ("risk" N3 "assess*") (which identifies instances where the word risk and assess (with any ending) appear within three words of each other). Similarly, on databases where full text searches were possible (i.e. CINAHL, MEDLINE and SAGE Journals) only the full tool name was entered as a search term to limit erroneous results from the abbreviated tool names that were also common words. Although the ProQuest Dissertations database offers a 'full text' search option, the terms "ASSET" AND "youth justice" returned over 80,000 hits when entered, therefore for this tool within this database the search terms were limited to 'all fields except full text'. For the tool ARMIDILO-S, initial searches identified that the full name of this tool differed across studies and that not all studies included "-S" in the abbreviation; therefore only the abbreviation "ARMIDILO" was used to search for this tool across all databases throughout the search process. Table B.1 details the full search strategy for PsycINFO.

Table B.1 Search Strategy for PsycINFO

Search #		SPJ tool search terms		Additional terms	Number of "hits"
1		"ARMIDILO*"			6
	OR				
2		"ASSET"	AND	"Youth Justice"	2
	OR				
3		"Dynamic Risk Assessment of Offender Re-entry"			1
	OR				
4		"DRAOR"			1
	OR				
5		"Level of Service Case Management Inventory"			70
	OR				
6		"LS/CMI"			9
	OR				
7		"Youth Level of Service Case Management Inventory"			60
	OR				
8		"YLS/CMI"			59
	OR				
9		"Short Term Assessment of Risk and Treatability"			27
	OR				
10		"START"	AND	"risk" N3 "assess*"	170
	OR				
11		"Short Term Assessment of Risk and Treatability Adolescent Version"			4
	OR				
12		"START:AV"			10
	OR				
13		"Structured Assessment of Protective Factors"			4
	OR				
14		"SAPROF"			10
	OR				
15		"Structured Assessment of Violence Risk in Youth"			53
	OR				
16		"SAVRY"			57
	OR				
17		"Structured Outcome Assessment and Community Risk Monitoring"			2
	OR				
18		"SORM"			5
	OR				
19		"Violent Extremist Risk Assessment"			1
	OR				
20		"VERA"	AND	"risk" N3 "assess*"	18
					TOTAL HITS:
				(searches 1 to 20 combined)	344
				Limiters – Publication Year: 1995 – 2015	339
				Limiters – English Language	339

Note: Search conducted on EBSCOhost Research Databases platform on 26th February 2015. All terms searched for in 'All Fields'.

Appendix C: Systematic Review – Data Extraction Form

Title
Author(s)
Year
Country
Study aims/hypotheses
Participant characteristics
Sampling (include selection process/procedures, location, and relevant population characteristics)
Number in study sample (include break-down by sub-groups if appropriate)
Key characteristics (e.g. age, ethnicity, history of violence, psychiatric diagnoses etc.)

Inclusion/exclusion criteria
Study characteristics
Design (prospective, pseudo-prospective, retrospective, other)
SPJ tool (s) assessing protective factors (including how rated)
Other measures (e.g. other risk assessment tools)
Outcome variable(s) (type/definition and how measured)
Follow-up period

Study findings
Violence base rates (details of number of incidents of violence or equivalent)
Key findings – statistical relationship between protective factors and violence (e.g. AUC value)
Summary of key findings relating to protective factors (including results of statistical tests where reported)

Appendix D: Systematic Review – Assessment of Risk of Bias Guidance

The purpose of the quality assessment is to determine whether there is a *risk of bias* that may impact on the accuracy and generalisability of the study findings. The Centre for Reviews and Dissemination (CRD, 2009) highlight the broad domains a quality assessment may consider, including: appropriateness of study design to the research question; choice of outcome measure; statistical issues; quality of reporting; quality of the intervention and generalisability.

Most established quality criteria checklists and guidelines are typically designed for use with intervention studies. Quality criteria for the present systematic review were therefore developed. In developing specific criteria, this ensured the criteria were relevant to the studies included in the review and allowed criterion to be tailored to the topic being studied and /or to target areas where bias may be most likely to occur.

The criteria were designed to assess risk of bias across the broad areas identified by the CRD. Criterion were formulated with reference to the Cambridge Quality Checklists (Jolliffe, Murray, Farrington, & Vannick, 2012; Murray, Farrington, & Eisner, 2009)) which were designed for assessing quality of studies investigating risk factors and the National Institute for Health and Care Excellence (NICE) guidelines for assessing methodological quality of prognostic studies (NICE, 2012; based on checklist from Hayden, Côté, & Bombardier, 2006).

A 3 point rating scale was utilised for each criteria:

- Well covered (2 points) [High quality – low risk of bias]
- Adequately covered (1 point) [Moderate quality – moderate risk of bias]
- Poorly covered (0 points) [Low quality – high risk of bias]

- Not covered (0 points) [Low quality – high risk of bias]

Where there is insufficient information to score a criterion and this cannot be obtained from another paper utilising the same sample, this criterion should be given a score of zero; as Murray et al. (2009) highlight, "without positive information about study quality, one cannot draw confident conclusions" (p. 7).

For each risk of bias criterion, guidance is given for each rating option. The guidance describes what a reviewer may expect to find in a study of that quality and covers key areas in which biases may occur. The coding guidance should be regarded as descriptive rather than prescriptive; for example, if a study does not address one aspect of the guidance listed for a "well covered" criterion, the study may still receive this rating if the reviewer judges this particular aspect to have a minimal risk of bias/impact on the study findings and the other aspects are well covered. Criterion guidance for "poorly covered" ratings describe key deficits, any one of which may introduce significant biases into the study which may impact on generalisability and accuracy of the findings.

Established quality criteria checklists and criteria in other published systematic reviews use various methods to categorise the overall quality and risk of bias within studies. For example, cut-off scores based on the number of quality criteria satisfied; total scores; average scores; or the authors own judgment of the likelihood that identified biases have impacted on the results.

None of the items in the current criteria checklist are weighted and it is noted that the average score may mask important methodological strengths or

weaknesses in a given study. Therefore the total score and the median rating will be taken as an indication of the overall risk of bias within the study.

Table D.1 Risk of Bias Criteria Guidelines

Domain	Criterion	Description	Rationale (risk of bias)
Study design	1. Clear aims/ hypotheses and appropriate design	*Well covered (2)* – aims or hypotheses are clearly described and the study design is appropriate for investigating these. *Adequately covered (1)* – aims or hypotheses are less well described and the study design is appropriate for investigating these. *Poorly covered (0)* – aims or hypotheses are not explicit or the study design is not appropriate for investigating the study aims or hypotheses.	Clearly stated hypotheses should guide the study design and statistical analysis; an inappropriate design may lead to results which are not valid (given the study aims) and are therefore difficult to interpret/generalise.
	2. Study design	*Well covered (2)* – prospective design; conducted 'in real time' where protective factors are measured prior to violence (i.e. the outcome) occurring. *Adequately covered (1)* – pseudo-prospective design where protective factors and violence are scored 'in the past', the protective factors are scored based on information that was available prior to the violence occurring (for example, archival data). *Poorly covered (0)* – retrospective (or post-dictive) design where protective factors are measured *after* violence outcome has occurred or cross-sectional designs where protective factors and violence are measured at the same time point.	Murray et al. (2009) highlight the importance of establishing temporal sequence when drawing conclusions about risk factors (predictive variables). Guy (2008) defines prospective, pseudo-prospective and retrospective study designs. She found that retrospective designs reported significantly different (higher) AUC values when looking at the predictive validity of SPJ risk assessments in terms of antisocial behaviour (compared to prospective and pseudo-prospective designs). Guy (2008) also noted that although researchers define their study as retrospective, it would actually be defined as pseudo-prospective. A potential bias is whether raters are aware of the violence outcome when measuring the presence of

Domain	Criterion	Description	Rationale (risk of bias)
			protective factors (and vice versa) – this is addressed in criterion number 7.
Sample	3. Sample description	*Well covered (2)* – the source and study population are clearly defined and described in terms of key individual characteristics – for example, age, sex, history of violence, psychiatric diagnoses etc. *Adequately covered (1)* – the source and study population are less well described in terms of key characteristics. *Poorly covered (0)* – key characteristics of the sample are not described.	The source and study population require to be clearly described in order to draw conclusions about whether the study population is representative of the source population and whether the findings of the study can be generalised to other (similar) populations.
	4. Sampling method	*Well covered (2)* – the study typically includes the following aspects: • The sampling method is clearly described (e.g. place of recruitment, period of recruitment, selection process) • The sample was selected using total cohort sampling or random sampling • The study sample is appropriate given the study aims/hypotheses and is representative of the source population (i.e. represents the population of interest) • Any inclusion/exclusion criteria are described and are appropriate given the study aims/hypotheses. *Adequately covered (1)* – the study typically includes the following aspects: • The sampling method may be less well described (it may be difficult to replicate or some aspects may not be clear) • The sample is based on total cohort sampling, random sampling, or random/weighted stratified sampling based on key characteristics • The study sample is appropriate given the study aims/hypotheses and is representative of the source population	The relationship between protective factors and violence may be influenced by a number of factors; it is unlikely that studies will be able to control for all of these factors. Studies are also unlikely to be experimental in nature (therefore there may be difficulties in controlling for confounding variables). Appropriate sampling is crucial so that results can be generalised. The sampling process should be well described and explicit to ensure that any potential biases can be identified and considered when interpreting the results.

Domain	Criterion	Description	Rationale (risk of bias)
		• Any inclusion/exclusion criteria may be less well described (the rationale may be less clear) but they seem appropriate given the study aims/hypotheses. *Poorly covered (0)* – the study typically includes one or more of the following aspects: • The sampling method is not well described – key aspects may not be defined (the process would be difficult to replicate) • The sampling is opportunistic/convenience (and does not represent a total cohort sampling) • The sample is not representative of the source population or population of interest in the study • Exclusion/inclusion criteria have been applied with no rationale, are inappropriate given the study aims/hypothesis or may impact on how representative the study population is.	
	5. Attrition /retention rates	*Well covered (2)* – the study typically includes the following aspects: • Reasons for attrition are clearly described • Characteristics of those who drop-out are described • Overall retention rate is acceptable (70% or more) (or there appears to be no attrition) • Attrition is not associated with key characteristics (e.g. protective factors, violence risk) • Attempts are made to follow-up participants who drop-out (where they are still eligible for inclusion in the study). *Adequately covered (1)* – the study typically includes the following aspects: • Reasons for attrition and characteristics of those who drop-out may be less well described • Overall retention rate is acceptable (70% or more) • Attrition is not associated with key characteristics (e.g. protective factors,	This criterion may be more relevant in prospective studies however can also be considered more widely in terms of missing data. The 70% response rate is adopted from the Cambridge Checklist (Murray et al., 2009). It is important to clarify whether the study population is still representative of the source population (i.e. the results are generalisable) and to also consider whether those who drop-out may vary from those retained in terms of protective factors or on some other key characteristic which may influence the relationship between protective factors and violence.

Domain	Criterion	Description	Rationale (risk of bias)
		violence risk). *Poorly covered (0)* – the study typically includes one or more of the following aspects: • Evidence of attrition that is not explained in the study or characteristics of those who drop-out are not described • Overall retention rate is less than 70% • Attrition is associated with key characteristics (e.g. protective factors, violence risk).	
	6. Sample size (statistical power)	*Well covered (2)* – post-hoc power calculation is reported and study is adequately powered (at .80) or sample size is greater than or equal to N=400. *Adequately covered (1)* – post-hoc power calculation is not reported, however sufficient detail is included to calculate power for main effect (relationship between protective factors and violence) and study is adequately powered (at .80) or sample size is greater than or equal to N=400. *Poorly covered (0)* – post-hoc power calculation is not reported and there is insufficient detail to calculate whether the study is adequately powered.	Murray et al. (2009) estimated that an adequate sample size would be greater or equal to 400 based on the sample being able to detect small effect sizes in a two-tailed test with *p*=.05 as the cut off for significance. A power analysis would be a more accurate way of determining the adequacy of the sample size - this can be calculated where sufficient data is reported. Most studies are likely to conduct ROC analysis. There appears to be no established power calculation formula for ROC analyses. ROC analysis is based on the ability to detect differences between two groups based on a predictor; therefore one way to determine the power would be to establish whether the two groups are statistically different – i.e. by comparing the mean protective scores for the violent and non-violent group. Therefore, to determine power use G*POWER (means-Mann Whitney) (Faul, Erdfelder,

Domain	Criterion	Description	Rationale (risk of bias)
			Lang & Buchner, 2007) and enter mean, standard deviation and sample size for both groups.
Measures	7. Measure of predictor (protective factors)	*Well covered (2)* – the study typically includes the following aspects: • The validity and reliability of the measure is well described and appropriate • The measure is appropriate for use with the population being studied • The training/experience of rater(s) is well described and adequate • Inter-rater reliability for the study is reported and at an acceptable level • The method of measurement is based on at least two sources (i.e., file, interview or informant) or where based on archival data only this derives from multiple sources (e.g. different professionals' assessments) • Where studies are pseudo-prospective or retrospective, raters are 'blind' to outcome (violence). *Adequately covered (1)* – the study typically includes the following aspects: • The validity and reliability of the measure may be less well described but appears appropriate • The measure may be less well standardised within the population being studied • The training/experience of rater(s) may be unclear • The method of measurement is based on one source or where based on archival data this is from a single source • Inter-rater reliability for the study is reported and at an acceptable level • Where studies are pseudo-prospective or retrospective raters are 'blind' to outcome (violence). *Poorly covered (0)* – the study typically includes one or more of the following aspects: • Validity and reliability of the measure (the SPJ tool) are not reported or are poor	The measure of the protective factor (i.e. the SPJ tool) should be appropriate for the population being studied (for example, in terms of age, type of risk being assessed). SPJ tools typically contain guidance but require a degree of assessor judgment to rate – therefore there are multiple ways in which biases may influence the measure of protective factors. A study with a low risk of bias will address all of these areas (see description). Guy (2008) found no significant difference in the AUC for antisocial behaviour for SPJ tools rated from file information alone compared to those based on file plus interview. However, Burl (2012) found that file rated SAVRY assessments were not comparable to expert clinical rating and that a number of items could not be rated. However, it is acknowledged that there may also be biases from interview or where the assessee is known to the assessor. The SPJ approach emphasises a multi-modal, multi-informant and multi-method approach in clinical practice – the criterion descriptions therefore aim to capture this aspect. Given the possible subjective nature of ratings, for

Domain	Criterion	Description	Rationale (risk of bias)
		• The measure is not appropriate for the population being studied • The method of measurement is not described • Inter-rater reliability for the study is not reported or is not at an acceptable level • In pseudo-prospective or retrospective studies raters are not 'blind' to the outcome (violence).	a score of 1 or 2 the study must report acceptable inter-rater reliability and raters must be blind to the outcome (violence).
	8. Measure of outcome (violence)	*Well covered (2)* – the study typically includes the following aspects: • The outcome (violence) is clearly defined • The outcome is consistent with (or included within) the definition of violence/outcome in the SPJ tool • The method or measure(s) used to assess the outcome are well described, valid and reliable[1] • Where relevant, inter-rater reliability for the study is reported and at an acceptable level • The follow-up period is described and is appropriate for the SPJ tool being used • Where a rater is required to make judgments about whether a behaviour is classified as violent or not, the rater is 'blind' to the predictor (protective factor) ratings[2] *Adequately covered (1)* – the study typically includes the following aspects: • The outcome (violence) may be less clearly defined • The outcome is consistent with (or included within) the definition of violence/outcome in the SPJ tool • The method or measure(s) used to assess the outcome may be less well described; the reliability and validity may be less robust. • Where relevant, inter-rater reliability for the study is reported and at an acceptable level	1 – VALIDITY AND RELIABILITY OF MEASURE: typically, violence is assessed using either official records (for example formal police arrests, charges, court appears, convictions, re-admission to custody); organisational records (for example, databases for recording of incidents); is coded from generic information (for example, checklists or coding criteria are used to code violent incidents from case files); or self-report. Official records are generally thought to under-estimate the level of violence. There may however be biases within organisational records (for example, staff would be required to notice and record an incident) and rater biases when coding information from file information (particularly if raters are aware of the protective factor ratings). Similarly, some methods or measures may not be appropriate for some settings (for example, incidents of violence may be less likely to lead to formal charges within institutional settings). For the purposes of a score of *well covered (2)* the

Domain	Criterion	Description	Rationale (risk of bias)
		• The follow-up period may extend beyond what is described within the SPJ manual • Where the rater is required to make judgments about whether a behaviour is classified as violent or not they are 'blind' to the predictor (protective factor) ratings *Poorly covered (0)* – the study typically includes *one or more* of the following aspects: • The outcome (violence) is not described or defined • The measure or method of determining the outcome is not described or clear • The measure or method is not valid or reliable • Inter-rater reliability for the study is not reported (where relevant) or is at an unacceptable level • Where the rater is required to make judgments about whether a behaviour is classified as violent or not they are not 'blind' to the predictor (protective factor) ratings.	reviewer should be satisfied that (1) the measure/method is concordant with the definition of violence within the study; (2) that the incidents identified will meet the definition of violence within the study; (3) that the measure/method does not seriously underestimate the outcome as defined in the study (multiple sources may be preferable); (4) that the measure/method is appropriate for the setting and population; and (5) that different raters would be likely to achieve the same outcome. 2 – 'BLIND' RATING: where outcome measures are more subjective (for example, identifying incidents of violence by reviewing generic case files), it is important that assessors are 'blind' to the predictor (protective factor) ratings.
	9. Measure of confounding variables (e.g. risk factors)	*Well covered (2)* – potential confounding variables are explicitly identified, clearly described, and measured using valid and reliable measures and are appropriately accounted for in the interpretation of the relationship between protective factors and violence. *Adequately covered (1)* – potential confounding variables are identified but less well described or measured and are appropriately accounted for in interpretation of the relationship between protective factors and violence. *Poorly covered (0)* – no potential confounding variables are identified or confounding variables are identified but not accounted for in the study in relation to the relationship between protective factors and violence.	It is anticipated that the majority of studies will not identify confounding variables for the relationship between protective factors and violence unless the primary aim or focus of the study is to explore protective factors. The main confounding variable is likely to be risk factors. Studies may explore or account for confounding variables through statistical analysis – for example, exploring protective factors within different categories of risk or evaluating the incremental validity of risk and protective factors.

Domain	Criterion	Description	Rationale (risk of bias)
Statistical analyses	10. Statistical analyses	*Well covered (2)* – the study typically includes the following aspects: • Statistical analyses are clearly explained (e.g. the rationale is stated) • Any underlying assumptions are addressed • Analyses are appropriate given the data and study aims/hypotheses • There is adequate presentation of data and results • Statistical results are interpreted appropriately. *Adequately covered (1)* – the study typically includes the following aspects: • Statistical analyses may be less well explained • It may be unclear if underlying assumptions have been adequately addressed • Analyses fully investigate the hypotheses stated but additional (or unnecessary) analyses may also be conducted • There is adequate presentation of data and results • The statistical results are interpreted appropriately. *Poorly covered (0)* – the study typically includes one or more of the following aspects: • Statistical analyses are not appropriate given the data or hypotheses • The hypotheses are not addressed • Insufficient data and results are reported • Statistical results are not interpreted appropriately • Data or results are selectively reported or interpreted.	When determining the appropriateness of statistical analyses, reviewers should consider the appropriateness of the selected tests (e.g. given type of data, base rates for violence) and the number of tests that are being conducted. Reviewers should also consider whether studies are using multiple tests to explore essentially the same effect or relationship.

Note: SPJ = structured professional judgment.

Appendix E: Empirical Study – Data Collection Recording Form

Data Recording Form (v4)

ID number:				
Demographic Information				
Forensic History		**Yes**	**No**	**Severity**
	Convictions, allegations and self-reported offending (incl violence)			
	Convictions for Violence			
	Violence (not-convicted)			
	Convictions for non-violence			
	Other offending (not convicted)			
	Violence in inpatient settings			
	Physical violence			
	Verbal violence			
	Sexual violence			
	Diversity/Frequency of offending **(taken from 'criminal versatility' item in the PCL-R$^{2nd\ ed}$** Hare (2003)**)**			
	Theft, break and enter, possession of housebreaking tools, possession of stolen property, loitering at night, etc.			
	Robbery, armed robbery, robbery with violence, extortion, etc.			
	Drug offences (possession, trafficking)			
	Assault, assault causing bodily harm, threatening, etc.			
	Murder, attempted murder, manslaughter, etc.			
	Possession of weapons, explosives			
	Sexual offences			
	Criminal negligence, including major driving offences (e.g. drive while intoxicated, hit and run, dangerous driving)			
	Fraud, forgery, false pretences, impersonation, uttering, etc.			
	Escape, unlawfully at large, jumping bail, failing to appear, breach of recognizance.			
	Kidnapping, unlawful confinement, forcible seizure, hijacking			
	Arson			
	Obstruction of justice, perjury, assaulting a police officer, etc.			
	Crimes against the state, including treason, espionage, smuggling evasion of income tax, etc.			
	Miscellaneous minor charges, including vandalism, causing a disturbance, mischief, wilful damage, minor driving offences, etc.			
	Total (yes items)			

Mental Disorder (note ICD 10 code(s) and whether a formal or suspected diagnosis	
Age (at beginning of outcome period)	
Violence during outcome period (note type, severity for incidents of violence and whether during first or second 6 months)	

HCR-20^{V3} (ratings of 0, 1 or 2).	
History of Problems with	
H1. Violence	
H2. Other antisocial behaviour	
H3. Relationships	
H4. Employment	
H5. Substance use	
H6. Major mental disorder	
H7. Personality disorder	
H8. Traumatic experiences	
H9. Violent attitudes	
H10. Treatment or supervision response	
Recent problems with	
C1. Insight	
C2. Violent ideation or intent	
C3. Symptoms of major mental disorder	
C4. Instability	
C5. Treatment or supervision response	
Future problems with	
R1. Professional services and plans	
R2. Living situation	
R3. Personal support	
R4. Treatment or supervision response	
R5. Stress or coping	

SAPROF (ratings of 0, 1 or 2)	
Internal Items	
1. Intelligence	
2. Secure attachment in childhood	
3. Empathy	
4. Coping	
5. Self-control	
Motivational Items	
6. Work	
7. Leisure activities	
8. Financial management	
9. Motivation for treatment	
10. Attitudes towards authority	
11. Life goals	
12. Medication	
External Items	
13. Social network	
14. Intimate relationship	
15. Professional care	
16. Living circumstances	
17. External control	
Final Protection Judgment (low, moderate or high)	
Integrative Final Risk Judgment (low, moderate or high)	

SAPROF items reproduced with permission from the authors.

Appendix F: Empirical Study – Ethical Approval Letters

Appendix F.1 – NHS Ethical Approval (1)

WoSRES
West of Scotland Research Ethics Service

NHS
Greater Glasgow and Clyde

West of Scotland REC 3
Ground Floor – The Tennent Institute
Western Infirmary
38 Church Street
Glasgow G11 6NT
www.nhsggc.org.uk

Miss Clare Neil
Trainee Clinical Psychologist
Forensic Community Mental Health Service,
Falkirk Community Hospital
Ward 17, Westburn Avenue
Falkirk
FK1 5SU

Date 2nd July 2013
Your Ref
Our Ref
Direct line 0141 211 2123
Fax 0141 211 1847
E-mail Liz.Jamieson@ggc.scot.nhs.uk

Dear Miss Neil

Study title: **Protective factors for violence risk in community forensic patients**
REC reference: **13/WS/0162**
IRAS project ID: **126953**

The Research Ethics Committee reviewed the above application at the meeting held on 27 June 2013. Thank you for attending to discuss the application.

We plan to publish your research summary wording for the above study on the NRES website, together with your contact details, unless you expressly withhold permission to do so. Publication will be no earlier than three months from the date of this favourable opinion letter. Should you wish to provide a substitute contact point, require further information, or wish to withhold permission to publish, please contact the Co-ordinator Mrs Liz Jamieson, Liz.Jamieson@ggc.scot.nhs.uk.

Ethical issues raised by the Committee in private discussion together with responses given when you were invited into the meeting

a) The Committee asked you to explain how the data would be kept confidential. You advised that you would review the case notes to see if a factor was present or not together with some demographic information, i.e. age, mental health, offending and then group into categories. Serious assault would be grouped generally and then coded. The code and list of names would be retained until another sample is taken then destroyed.

b) The Committee asked you if you had considered there were ethical issues in relation to the Key Worker being involved in the consent process. You advised that the Nurses will know the patients very well and have a close working relationship which would perhaps make the patients feel obliged to take part. You also advised that you would strongly emphasise to the nursing staff that taking part in the study is voluntary and this must be made clear to the patients. You commented that the Nurses will want to encourage the patients to take part as the research would be of benefit to their service. The Committee asked if you thought there could be an

alternative method of obtaining consent without involving the Key Worker. You responded indicating that due to timescales you would not be in a position to personally obtain consent.

c) The Committee asked whether it would be possible to categorise the patients by episodes. You advised that the tool is designed to identify protective factors so not just violence.

After you left the meeting Committee had further discussion and agreed the following:

- That the study was a case note review and as long as there was appropriate Caldicott Guardian approval in place then there was no need for consent. The Committee agreed that it would be helpful if the Caldicott Guardian approval be refreshed in view of the time since approval was given.

Ethical opinion

The members of the Committee present gave a favourable ethical opinion of the above research on the basis described in the application form, protocol and supporting documentation, subject to the conditions specified below.

Ethical review of research sites

NHS Sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

- Please obtain refreshed Caldicott Guardian approval since the initial approval was granted in February 2013.

You should notify the REC in writing once all conditions have been met (except for site approvals from host organisations) and provide copies of any revised documentation with updated version numbers. The REC will acknowledge receipt and provide a final list of the approved documentation for the study, which can be made available to host organisations to facilitate their permission for the study. Failure to provide the final versions to the REC may cause delay in obtaining permissions.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission ("R&D approval") should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements.

Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at http://www.rdforum.nhs.uk.

Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of approvals from host organisations

It is responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Approved documents

The documents reviewed and approved at the meeting were:

Document	*Version*	*Date*
Investigator CV	CI Neil	01 April 2013
Other: CV Supervisor	Power	
Other: Summary of Changes to IRAS		
Other: List of References for REC application		01 April 2013
Other: Caldicott Guardian Approval		27 February 2013
Other: Data Recording Form	2	15 May 2013
Participant Consent Form: PCF	1	13 May 2013
Participant Information Sheet: PIS	1	13 May 2013
Participant Information Sheet: Staff IS	1	13 May 2013
Protocol	2	15 May 2013
REC application		02 April 2013
REC application	Revised draft w Consent IRAS	21 May 2013
Response to Request for Further Information		13 May 2013
Response to Request for Further Information	Response cover Letter	21 May 2013

Membership of the Committee

The members of the Ethics Committee who were present at the meeting are listed on the attached sheet.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Reporting requirements

The attached document "After ethical review – guidance for researchers" gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol

- Progress and safety reports
- Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

Feedback

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

Further information is available at National Research Ethics Service website > After Review

13/WS/0162	**Please quote this number on all correspondence**

We are pleased to welcome researchers and R & D staff at our NRES committee members' training days – see details at http://www.hra.nhs.uk/hra-training/

With the Committee's best wishes for the success of this project.

Yours sincerely

Liz Jamieson
On behalf of Dr Adam Burnel, Chair

Enclosures:	List of names and professions of members who were present at the meeting and those who submitted written comments "After ethical review – guidance for researchers"
Copy to:	Ms Marianne Laird, University of Edinburgh Ms Allyson Bailey, NHS Forth Valley

Appendix F.2 – NHS Ethical Approval (2)

WoSRES
West of Scotland Research Ethics Service

NHS
Greater Glasgow and Clyde

West of Scotland REC 3
Ground Floor – The Tennent Institute
Western Infirmary
38 Church Street
Glasgow G11 6NT
www.nhsggc.org.uk

Miss Clare Neil
Trainee Clinical Psychologist
NHS Forth Valley
Forensic Community Mental Health Service,
Falkirk Community Hospital
Ward 17, Westburn Avenue
Falkirk
FK1 5SU

Date 18th July 2013
Your Ref
Our Ref
Direct line 0141 211 2123
Fax 0141 211 1847
E-mail Liz.Jamieson@ggc.scot.nhs.uk

Dear Miss Neil

Study title: **Protective factors for violence risk in community forensic patients**
REC reference: **13/WS/0162**
IRAS project ID: **126953**

Thank you for your email of 16th July 2013. I can confirm the REC has received the documents listed below and that these comply with the approval conditions detailed in our letter dated 02 July 2013

Documents received

The documents received were as follows:

Document	*Version*	*Date*
Other: Refreshed Caldicott Guardian Approval		15 July 2013

Approved documents

The final list of approved documentation for the study is therefore as follows:

Document	*Version*	*Date*
Investigator CV	CI Neil	01 April 2013
Other: CV Supervisor	Power	

Other: Summary of Changes to IRAS		
Other: List of References for REC application		01 April 2013
Other: Data Recording Form	2	15 May 2013
Other: Refreshed Caldicott Guardian Approval		15 July 2013
Participant Consent Form: PCF	1	13 May 2013
Participant Information Sheet: PIS	1	13 May 2013
Participant Information Sheet: Staff IS	1	13 May 2013
Protocol	2	15 May 2013
REC application		02 April 2013
Response to Request for Further Information		13 May 2013
Response to Request for Further Information	Response cover Letter	21 May 2013

You should ensure that the sponsor has a copy of the final documentation for the study. It is the sponsor's responsibility to ensure that the documentation is made available to R&D offices at all participating sites.

13/WS/0162 **Please quote this number on all correspondence**

Yours sincerely

Mrs Liz Jamieson
Committee Co-ordinator

Copy to: Ms Marianne Laird, University of Edinburgh
Miss Allyson Bailey, NHS Forth Valley

Appendix F.3 – The State Hospital Research Committee Approval

Clare Neil
Trainee Clinical Psychologist
NHS Forth Valley

Tuesday the 4th of March 2014

Dear Clare,

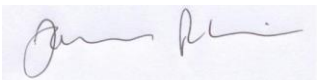
Re: Protective Factors for Violence Risk in Forensic Patients

Many thanks for your response to the feedback from the TSH Research Committee review of your research proposal. The committee are satisfied that you have addressed the queries raised within the feedback and are happy to approve the study. This letter will be copied to the Associate Medical Director along with evidence of your ethical approval, and he will subsequently provide final management approval for the study to take place within TSH.

One condition of the research committees' approval is that you provide the committee with regular 6-monthly progress reports, however given the slight concern over the workload associated with the data collection and also the possibility of missing data we request that you initially provide more regular updates. If you can provide updates every 3 months until the feasibility of the workload and the availability of data have been established, then we can return to the 6 monthly updating. The progress reports are an important mechanism by which the committee track progress, and is also a key component of our research governance processes. Your first progress report should be completed using the attached proforma and returned to me by Monday the 16th of June 2014.

If you require any further assistance, or have any feedback on the Research approval process then please do not hesitate to contact me.

Yours sincerely



JAMIE PITCAIRN
Research & Development Manager
The State Hospital

Appendix F.4 – The State Hospital Management & Caldicott Guardian Approval

The State Hospital

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Clare Neil
Trainee Clinical Psychologist
Forensic Community Mental Health Service
Falkirk Community Hospital
Ward 17, Westburn Avenue
Falkirk FK1 5SU

Date 7 March 2014
Your Ref
Our Ref FD/ag

Enquiries to Ann Gallacher
Direct Line 01555 842221
E-mail ann.gallacher1@nhs.net

Dear Ms Neil

Re: Protective Factors for Violence Risk in Forensic Patients

Having considered the views of the Research Committee and noted that you have obtained ethical approval from WoSRES, I write to give you Managerial Approval to proceed with your project. This is subject to you fulfilling the requirements of the Ethics Committee and of the State Hospital Research Committee.

May I take this opportunity to wish you every success in your endeavour.

Yours sincerely

Dr Fergus Douds
Joint Associate Medical Director
cc. Jamie Pitcairn, Research and Development Manager.
Professor Lindsay Thomson, Medical Director.

Appendix F.5 – NHS Ethical Approval Update (with amendments to study protocol)

ANNUAL PROGRESS REPORT TO MAIN RESEARCH ETHICS COMMITTEE

(For all studies except clinical trials of investigational medicinal products)

To be completed in typescript and submitted to the main REC by the Chief Investigator. For questions with Yes/No options please indicate answer in bold type.

1. Details of Chief Investigator

Name:	Clare Neil
Address:	NHS Forth Valley Forensic Community Mental Health Service Falkirk Community Hospital Ward 17 Westburn Avenue Falkirk FK1 6SU
Telephone:	01324 616 211
E-mail:	clare.neil@nhs.net
Fax:	

2. Details of study

Full title of study:	Protective Factors for Violence Risk in Forensic Patients (NB this is a new title – the previous title was Protective Factors for Violence Risk in Community Forensic Patients)
Name of main REC:	West of Scotland REC 3
REC reference number:	13/WS/0162
Date of favourable ethical opinion:	2nd July 2013
Sponsor:	ACCORD (Academic and Clinical Central Office for Research and Development) Marianne Laird (Clinical Research Administrator) Research Governance and QA Office University of Edinburgh The Queen's Medical Research Institute 47 Little France Crescent Edinburgh EH16 4TJ

3. Commencement and termination dates

Has the study started?	***Yes*** / *No*
If yes, what was the actual start date?	September 2013
If no, what are the reasons for the study not commencing? What is the expected start date?	
Has the study finished? *If yes, complete and submit "Declaration of end of study" form, available at http://www.nres.npsa.nhs.uk/applications/after-ethical-review/endofstudy/*	*Yes* / ***No***

If no, what is the expected completion date? If you expect the study to overrun the planned completion date this should be notified to the main REC for information.	29th May 2015 (original expected completion date was 29th August 2014; REC still to be notified of this change).
If you do not expect the study to be completed, give reason(s)	

4. Registration

Is the study a 'clinical trial'? (Defined as first 4 categories on the IRAS filter page) (For CTIMP please use CTIMP progress reporting template)	*Yes* / ***No***
Is the study registered on a publically accessible database? (Registration of clinical trials is a condition of approval for studies approved after 30 September 2013)	Yes / **No**
If yes, please provide the name of the database and the registration number Database: Registration number:	
If no: What is the reason for non registration? The study is registered within the Forensic Mental Health Services Managed Care Network Research Database. This is not publically accessible. What are your intentions for registration? N/A	

5. Site information

Do you plan to increase the total number of sites proposed for the study? If yes, how many sites do you plan to recruit?	**Yes** / No The study has been transferred to a new site. The study is now taking place in The State Hospital (and not in NHS Forth Valley). See difficulties in recruiting participants section below.

6. Recruitment of participants

In this section, "participants" includes those who will not be approached but whose

samples/data will be studied.

Number of participants recruited:	Proposed in original application: 85 *Actual number recruited to date: 35*
Number of participants completing trial:	*Actual number completed to date: 26*
Number of withdrawals from study to date due to: (a) withdrawal of consent (b) loss to follow-up (c) death (where not the primary outcome) Total study withdrawals: 0	
*Number of treatment failures to date (prior to reaching primary outcome) due to: (a) adverse events (b) lack of efficacy Total treatment failures: * Applies to studies involving clinical treatment only	
Have there been any serious difficulties in recruiting participants?	**Yes** / No
If Yes, give details: The study requires assessment tools to be scored from information contained in patient files. There were significant difficulties in collecting data within NHS Forth Valley – file information was at times limited and not concise and there were increased time constraints due to the delay in the ethical approval process (which had gone to appeal). This made it difficult to reliably score the assessment tools and to achieve the required sample size. It was therefore not possible to continue with the study in NHS Forth Valley and complete it within the time available. The study was therefore transferred to The State Hospital. Patient files there contain key documents which include detailed information that can be used to score the assessment tools.	

There were minor amendments to the study protocol in terms of inclusion/exclusion criteria, recruitment process and data management required to conduct the study in the new site. The study received approval from The State Hospital's Research and Development Committee and the study was granted both Management and Calidicott Guardian approval. Guidance in the "After Ethical Review" information sheet indicated that the amendments were classified as minor and therefore further ethical approval/notification was not required (see section 6.3 - "The Committee's favourable opinion for the study will apply to any new sites and other changes at sites provided that management permission is obtained. There is no need to notify the Committee (or any other REC) about new sites or other changes, or to provide a copy of the SSI Form." The Sponsor was notified of the change in site in March 2014. Data collection in the new site began in April 2014.

Do you plan to increase the planned recruitment of participants into the study? *Any increase in planned recruitment should be notified to the main REC as a substantial amendment for ethical review.*	Yes / **No**

6. Safety of participants

Have there been any related and unexpected serious adverse events (SAEs) in this study?	Yes / **No**
Have these SAEs been notified to the Committee? *If no, please submit details with this report and give reasons for late notification.*	Yes / No /**Not applicable**
Have any concerns arisen about the safety of participants in this study? *If yes, give details and say how the concerns have been addressed.*	*Yes / **No***

7. Amendments

Have any substantial amendments been made to the trial during the year?	Yes / **No**
If yes, please give the date and amendment number for each substantial amendment made.	

8. Serious breaches of the protocol

Have any serious breaches of the protocol occurred during the year? *If Yes, please enclose a report of any serious breaches not already notified to the REC.*	*Yes* / ***No*** *Yes* / ***No***

9. Other issues

Are there any other developments in the study that you wish to report to the Committee? Are there any ethical issues on which further advice is required? *If yes to either, please attach separate statement with details.*	*Yes* / ***No*** *Yes* / ***No***

10. Declaration

Signature of Chief Investigator:	Clare Neil
Print name:	CLARE NEIL
Date of submission:	18th August 2014

Appendix G: Empirical Study – Correlation Matrix with all Measures and Violence

Table G.1 Correlations between HCR-20, SAPROF, Structured Professional Judgment (SPJ) Estimates, Violence and Disruptive Behaviour

	Clinical	Risk Management	HCR-20 Total	Internal	Motivational	External	SAPROF Total	FPJ	IFRJ	Violence (any)	Physical Violence	Verbal Violence	Sexual Violence	Disruptive Behaviour
Historical	-.20 (.087)	.14 (.241)	.47* (.000)	-.07 (.536)	.16 (.161)	-.01 (.912)	.10 (.411)	.16 (.177)	-.21 (.075)	-.15 (.203)	-.09 (.442)	-.20 (.091)	-.19 (.104)	-.10 (.377)
Clinical		.47* (.000)	.64* (.000)	-.54* (.000)	-.61* (.000)	-.23 (.044)	-.66* (.000)	-.64* (.000)	.68* (.000)	.37 (.001)	.27 (.021)	.40* (.000)	.34 (.003)	.40* (.000)
Risk Management			.58* (.000)	-.34 (.003)	-.56* (.000)	-.26 (.026)	-.56* (.000)	-.54* (.000)	.52* (.000)	.33 (.004)	.24 (.039)	.24 (.035)	.18 (.123)	.44* (.000)
HCR-20 Total				-.48* (.000)	-.49* (.000)	-.25 (.034)	-.55* (.000)	.49* (.000)	.44* (.000)	.24 (.039)	.16 (.172)	.20 (.082)	.10 (.379)	.34 (.003)
Internal					.42* (.000)	.22 (.061)	.68* (.000)	.56* (.000)	-.51* (.000)	-.32 (.005)	-.28 (.015)	-.19 (.110)	-.16 (.182)	-.28 (.017)
Motivational						.28 (.015)	.91* (.000)	.78* (.000)	-.64* (.000)	-.34 (.003)	-.25 (.028)	-.23 (.045)	-.13 (.280)	-.31 (.008)
External							.49* (.000)	.27 (.019)	-.22 (.059)	-.20 (.086)	-.22 (.063)	-.25 (.032)	-.15 (.189)	-.25 (.031)
SAPROF Total								.81* (.000)	-.68* (.000)	-.42* (.000)	-.35 (.002)	-.29 (.011)	-.20 (.084)	-.38 (.001)
FPJ									-.77* (.000)	-.51* (.000)	-.41* (.000)	-.37 (.001)	-.25 (.030)	-.52* (.000)
IFRJ										.55* (.000)	.43* (.000)	.49* (.000)	.32 (.005)	.57* (.000)
Violence (any)											.90* (.000)	.73* (.000)	.36 (.001)	.81* (.000)
Physical Violence												.57* (.000)	.40* (.000)	.69* (.000)
Verbal Violence													.50* (.000)	.67* (.000)
Sexual Violence														.39 (.000)

Note. N = 75. Spearman's Rho (r_s)correlation (significance level, 2-tailed). HCR-20^{V3} = Historical Clinical Risk Management-20 (version 3). SAPROF = Structured Assessment of Protective Factors. FPJ = Final Protection Judgment. IFRJ = Integrative Final Risk Judgment.

* r_s is significant at the Bonferroni corrected *p* value .0004 (.05/105).